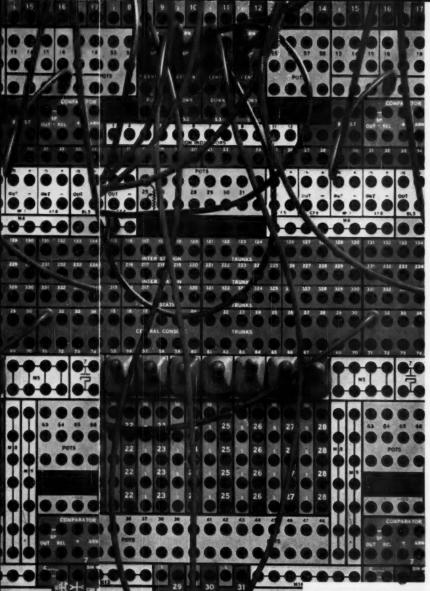
AUGUST 6, 1960

Chemical Week

A MCGRAW-HILL PUBLICATION

PRICE FIFTY CENTS



Chemical stock slump.
It reflects slipping
profits, cooling business climate . . . p. 21

Citric competition flares as Bzura begins belated-but big-new sales effortp. 43

Nitrogen's new uses in steelmaking, missiles spur 10% capacity boost .p. 53

Pegging researchers'
potential takes on new
urgency with rising
staff costsp. 66

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ONIVERSITY MICROFILMS

STEVENS RICE



Produced in new cells under the most modern, continuous automatic controls, FMC Chlorine is unexcelled for consistent purity.

And, with one of the biggest electrolytic chlor-alkali plants, strategically located at South Charleston, West Virginia, we give fast, dependable service to chlorine users throughout the industrial areas of the East, New England and deep into the Midwest and mid-South.

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Putting Ideas to Work

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Chlor-Alkali Division

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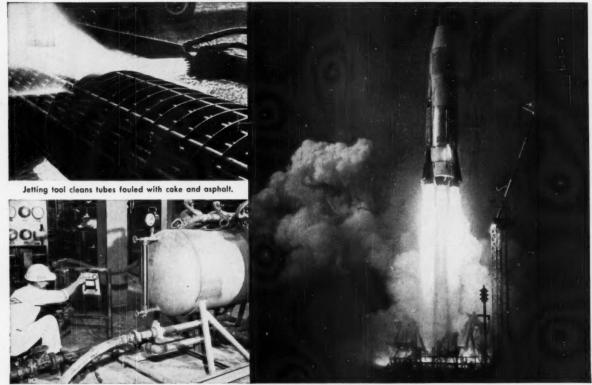


FOOD
MACHINERY
AND
CHEMICAL
CROPORATION

A new mark for a nation-wide

cleaning service . . .





New mobile foam-cleaning equipment cuts cleaning costs.

Cleaning missile lines and components requires tolerances as close as 150 microns.

DOW INDUSTRIAL SERVICE

Industrial Cleaning. Dow Industrial Service, now a separate division of The Dow Chemical Company, offers the only nation-wide chemical cleaning service for virtually all types of industrial processing equipment. This is an expansion of the cleaning service developed over the past 20 years. Dow is currently servicing entire plants as well as doing special cleaning jobs for both large and small companies.

Dow Industrial Service research in industrial chemical cleaning has developed specialized mobile equipment and techniques, some of which are pictured above. These highly efficient techniques are improving plant productivity and reducing equipment downtime in all industries using steam generators, condensers, heat exchangers, towers, water and product lines, water wells and tanks, or similar process equipment.

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You'll find Dow Industrial Service offices and stations with specialized cleaning equipment and experienced personnel in all major industrial areas. For more information, write to Dow Industrial Service, 20575 Center Ridge Road, Cleveland 16, Ohio.

DOW INDUSTRIAL SERVICE



Division of THE DOW CHEMICAL COMPANY

DIXON H,SO, on the scene wherever Quality and service count DIXON

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Reprints of Industrial Series Without Copy Available on Request.

ON THE COVER: The colorful pattern shown is a portion of the "problem plugboard" at Convair Astronautics plant of General Dynamics Corp. Data from test firings of Atlas missiles, for example, are fed into computers through such boards.



Themical Week

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with 2 new TERGITOL **Nonionics**

She has many cleaning jobs each day, and for each she has a favorite product—the one that helps her best. Be certain that your product is one of her regulars; customize its formula with TERGITOL Nonionics.

CARBIDE offers a complete selection of TERGITOL Surfactants, each with distinctive and useful properties. And, a continuing research program in detergent chemistry brings you such new products as-

TERGITOL E-68-a semi-solid nonionic, with high water solubility and good caustic stability. The cloud point of a 0.5 per cent solution of E-68 in distilled water is 68°C. (154.4°F.).

TERGITOL E-35-another causticstable nonionic for use with dry alkaline compounds. The cloud point of a 0.5 per cent solution is 35°C. (95°F.). E-35 has low foaming and good wetting action and is highly effective for heavy-duty cleansing of many types.

E-35 and E-68 can be effectively combined with other TERGITOL Nonionics to give you a detergent product that is one of her regulars. The CARBIDE Technical Representative in your area will gladly discuss your special requirements with you - and he'll show you how combination orders of TERGITOL Nonionics can save you money while allowing you to customize your formula. Give him a call; or write: Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.

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UNION CARBIDE CHEMICALS COMPANY

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The Air Force vs. Business

SOCIALISTS RUNNING THE AIR FORCE? It's a ridiculous exaggeration, but the simile does point up a situation that is causing consternation. Government ownership of production facilities is one of the tenets of socialism; and the Air Force has been busy trying to justify building and operating 70 oxygen generating plants instead of letting private industry do the job.

At a Senate subcommittee hearing some weeks ago, General F. J. Sutterlin argued his case: liquid oxygen cannot be stored for long periods of time; commercial sources may be sabotaged or destroyed in wartime; similar conditions might disrupt or destroy transportation facilities; purity of commercial product might suffer in wartime; Air Force operation of the complex equipment would assure availability of trained manpower; and commercial installations are subject to strikes. (C. W. Washington Newsletter, June 25).

In rebuttal, T. M. Kean, president of the Independent Oxygen Manufacturers Assn., knocked down this questionable case by pointing out that:

- Private industry can deliver with existing facilities all foreseeable requirements—and at substantially less cost.
- Presently available storage equipment can assure each Air Force base a sufficient on-hand supply.
- Widely dispersed commercial sources are less likely to be destroyed in war than the bases themselves.

He didn't touch on labor problems, but it seems inconceivable to us that under emergency conditions the government would permit either the draft or labor grievances to disrupt war production, any more than it did during World War II.

The oxygen squabble typifies the larger problem of government competition with private enterprise. It is the announced policy of this Administration to discontinue all "unnecessary commercial activities by government agencies which infringe on the prerogatives of private enterprise."

But how well is it doing? Elmer B. Staats, Deputy Director of the Bureau of the Budget, at the same hearing gave a progress report. He said that in May 1956 there were 19,333 commercial industrial installations in civilian agencies. By July 31, 1959, 17,271 of them were still operating, and an additional 236 were started between Jan. 1957 and July 1959. There are, in addition, about 5,000 facilities operated by the armed services, and these produce far more goods than the civilian installations.

Now, many of these installations are certainly necessary. Some are justified as integral functions of the sponsoring agencies, others for national security, or geographic location, or because it is impractical to contract the work with private companies. Government officials must do what has to be done in order to discharge their responsibilities.

But one of those responsibilities is to spend public funds wisely. Another is to support — not hobble — the private sector of our economy, which to an overwhelming extent provides those public funds through taxes. Every governmental activity that appears to be in conflict with private industry should be carefully scrutinized — and not by those who would be shorn of power or prestige by a change in the status quo.

Report from Tidewater...

How Cooper-Bessemer hydrogen boosters supply 800 psi 'round-the-clock

At Tidewater Oil Company's refinery south of Wilmington, Delaware, two Cooper-Bessemer FM-2 compressors play a vital part in the hydrogen treatment process by which the refinery upgrades a number of products and intermediate fractions. These hydrogen boosters operate 24 hours per day, boosting 690 cfm of hydrogen at 470 psi to a discharge of 800 psi. This hydrogen is delivered directly to the desulfurizers.

These Cooper-Bessemer compressors have performed well under this heavy-duty service. Maintenance costs and outage time have been low.

The customer is also pleased with the performance of three Cooper-Bessemer air compressors which supply utility air to the entire refinery on a 24-hour, 365-day per year basis.

Find out how Cooper-Bessemer products can help assure dependable compression and optimum economy for *your* processing. Call our nearest office for help in planning of your facilities.

BRANCH OFFICES: Grove City • New York • Washington Gloucester • Pittsburgh • Chicago • Minneapolis • St. Louis Kansas City • Tulsa • New Orleans • Shreveport • Houston Greggton • Dallas • Odessa • Pampa • Casper • Seattle San Francisco • Los Angeles

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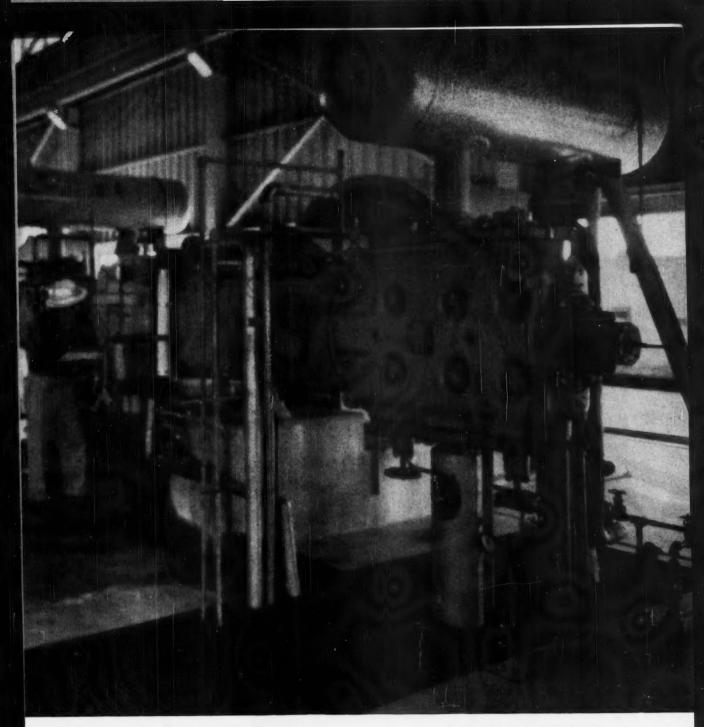
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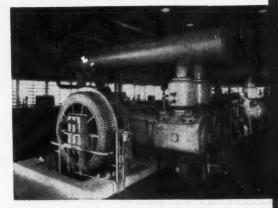
ENGINES: GAS - DIESEL - GAS - DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL,
ENGINE, TURNING OR MOTOR DRIVEN





◆ Cooper-Bessemer FM-2 Hydrogen Compressors at Tidewater Refinery. Rated 690 cfm, suction 470 psi, discharge 800 psi.

Three Cooper-Bessemer Air Compressors at Tidewater. They supply utility air at about 120 psi for processes throughout the refinery.





Storage can be simple

A phone call to General American solves all your bulk liquid storage problems.

General American has six terminals close to the nation's top markets, where you can lease as much or as little tankage as you require.

When you store with General American, you have no capital



investment, no operating problems. You have flexibility of inventory and product to meet your needs and the market's opportunities. Tanks can be bonded, if desired. You enjoy complete privacy, with experienced crews on hand to operate individual pipe lines. Blending and packaging equipment, loading docks and other facilities are available as needed.

Your warehouse receipts are A-1 collateral.

Ask the nearest General American office about terminal facilities.

It pays to plan with General American.

GENERAL

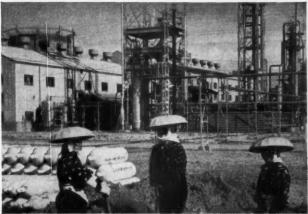
GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street · Chicago 3, Illinois Offices in principal cities

Terminals Division'



AMMONIA



- . 20 NEW PLANTS IN 7 COUNTRIES
- . 8 NEW PLANTS IN THE U.S.A.
- 1,113,000 TONS PER YEAR

Since the first months of 1957, 13 new Chemico ammonia plants have been completed and put into operation. Another 7 Chemico plants are under construction or in the engineering stages. The design capacity of these 20 plants totals more than 1,000,000 tons per year.

Chemico's versatility in ammonia plant design is evidenced by the variety of raw materials on which these plants are based. While natural gas was the most common, crude oil, fuel oil and coke oven gas were also used. Regardless of feed stock, however, all thirteen of the operating plants were completed on schedule and started up without significant difficulties or delays. One plant, designed to produce 150 tons per day, took less than ten months to build, from initial go-ahead to completion of a satisfactory test-run.

This outstanding record in the ammonia field is just one of the reasons why chemical and petroleum companies all over the world continue to call on Chemico when they require ENGINEERING AT ITS BEST.





Call on Rhodia "Odor Engineering" to solve your malodor problems in plant or product

Rhodia Inc. is the world leader in industrial odor control and reodorization technology and a primary producer of industrial aromatic chemicals. It offers fully qualified consultation service anywhere in the United States without cost or obligation.

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NAME	
NAMEADDRESS	

RHODIA INC.

60 East 56 St., New York 22, New York (Phone: PLaza 3-4850)

LETTERS

Likes Reports

To THE EDITOR: Your article on Food Additives by A. Haldane Gee (July 9) was most interesting. I am sure it will be very helpful to persons in the food packaging industry.

Let's have more of this comprehensive type of material in your publication.

S. LEONARD HANDEN
Laboratory Director
The National Plastic Products Co.
Odenton, Md.

Lower Tariffs Urged

To the Editor: I read with interest the articles (July 23) with respect to both the GATT conferences and the role that SOCMA is playing in support of a high-tariff position on synthetic organic chemicals.

While I appreciate that SOCMA has an obligation to its members to oppose lower tariffs, it becomes necessary for the citizenry at large to examine the relative merits and demerits of all petitions for both higher and lower tariffs, with respect to the general welfare as well as with respect to the self-interest needs that any industry or group wants, as viewed through their own myopic spectacles.

I submit that the coal-tar chemical manufacturers have a unique advantageous position in the annals of American manufacturers. I can fully understand their desire to keep it that way, but I think we ought not seriously to expect government officials to be too sympathetic.

The rate of import duty imposed on coal-tar chemicals in general is on the unique "American selling price" basis. Only coal-tar chemicals, of all the commodities imported by this country, enjoy this special status. It is special because the already high tariff is from 20% to 45% (with an additional fixed cents-per-pound tariff) and is based on the price that the American manufacturer alleges is charged his customers.

This privilege is abused by the use of discounts and rebates; but aside from that, the fact that many products are available from abroad at one-half to two-thirds of the American manufacturers' selling price means that the actual ad valorem rate paid is often 50% or more. This

fact is, unfortunately, not publicized by those interested in maintaining high tariffs.

I would like to point out, also, that this tariff structure was instituted in the early 1920s at a time when a then-infant chemical industry needed protection. However, as a multibillion-dollar industry today, this hardly seems to be the situation, and it is of interest to note that the total foreign value of coal-tar products imported during 1959 under paragraphs 27 and 28 of the tariff (based on Tariff Commission data just released) is \$35 million, and this includes substantial quantities of noncompetitive and shortage chemicals, which would make the total even less if available

Since my company sells both imported and domestically produced chemicals, we admittedly have a vested interest in seeing tariffs lowered on certain imported ones. However, from the point of view of the general welfare, there are undoubtedly many inequalities in the tariff structure. It appears to me that if anyone has a complaint in this regard, the greatest weight of merit is in the direction of lower, not higher, tariffs.

A. J. FRANKEL Vice-President and General Manager Aceto Chemical Co. Flushing, N. Y.

MEETINGS

Gordon Research Conferences at Colby Junior College, New London, N.H.—Aug. 8-12, food and nutrition; Aug. 15-19, medicinal chemistry; Aug. 22-26, catalysis; Aug. 29-Sept. 2, cancer.

Gordon Research Conferences at New Hampton School, New Hampton, N.H.—Aug. 8-12, organic coatings; Aug. 15-19, analytical chemistry; Aug. 22-26, inorganic chemistry; Aug. 29-Sept. 2, adhesion.

Gordon Research Conferences at Kimball Union Academy, Meriden, N.H.—Aug. 8-12, chemistry and physics of solids: point defects; Aug. 15-19, toxicology and safety evaluations; Aug. 22-26, infrared spectroscopy; Aug. 29-Sept. 2, high-temperature chemistry: kinetics of vaporization and condensation processes.

Industrial Research Conference, Arden House, Harriman, N.Y., Aug. 7-13.

Heat Transfer Conference and Exhibit, Statler-Hilton Hotel, Buffalo, N.Y., Aug. 15-17.

American Chemical Society, National meeting, New York, Sept. 11-16.

Beginning a new series . . .

A CHEMICAL PROCESSING INDUSTRY FILE

In order to help chemists, engineers, and management men in keeping up with the frequent changes that occur in the chemical processing industry, Dow is instituting a product information series . . . Dow CPI Files.

It is the purpose of this new series to make product information more useful to those concerned with chemical processing. Instead of presenting new chemicals as isolated items, this series will present products as they are related to classes of processing problems.

Sometimes these products will be new, or newsworthy. Sometimes they will be established products with new or continuing relevance to today's problems. Always they will be presented in their relation to a particular area of interest to processors.



Dow products relating to emulsification will be covered in this first series of advertisements. On the next page, the first ad in the series describes alkanolamine soaps as emulsifiers, and methylcellulose as a thickener and surfactant. Later advertisements will present other emulsifier intermediates and additives, plus new Dow emulsifiers soon to be announced.



THE DOW CHEMICAL COMPANY • Midland, Michigan

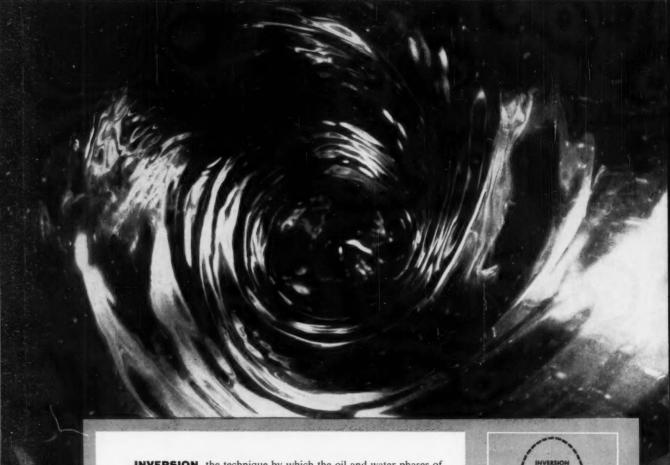
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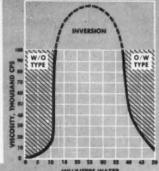
EMULSIFICATION

PRIMARY CONSIDERATIONS in the choice of emulsification materials are

compatibility of the components, viscosity, stability, particle size, and toxicity. On the next page are shown the properties of methylcellulose, a highly effective, safe emulsifier. Described below is a formulating technique with Dow alkanolamines contributing to higher viscosity, smaller particle size, and thus greater stability.



INVERSION, the technique by which the oil and water phases of an emulsion change relationships, is recommended for use in all methods of alkanolamine emulsion formulating when maximum stability is desired. Graph shows changeover of a triethanolamine emulsion. The fatty acid was dissolved in the oil and the TEA was dissolved in the resulting acid-oil solution. Then, with stirring, small increments of water were added. The graph is characteristic of all alkanolamines if the same procedure is followed.



INTERMEDIATES

ALKANOLAMINE SOAPS—NONCORROSIVE, STABLE, SAFE FOR SKIN AND TEXTILES

MOST IMPORTANT of the Dow alkanolamines, all water soluble, are monoethanolamine (MEA), triethanolamine (TEA), monoisopropanolamine (MIPA), and diisopropanolamine (DIPA). Compared to other amines in the alkanolamine series, these compounds produce emulsions having finer particle size and greater stability.

Being essentially neutral, emulsions prepared with alkanolamines are relatively noncorrosive to metals and are not harmful to the skin nor to textiles. Frequently a natural oil will contain enough organic acid so that in the presence of an alkanolamine it will emulsify readily in water. Alkanolamine-fatty acid emulsions are easily prepared from such common acids as oleic, stearic, and palmitic. End use will determine the acid used. For example, oleic acid yields low viscosity, stearic higher viscosity. Proven uses for alkanolamine soaps include metal cutting and buffing compounds; floor, furniture, and car polishes; pharmaceutical ointments, skin creams and lotions; insecticide sprays, textile scouring, and wetting agents.

For a comprehensive coverage of the Dow alkanolamines, write for the Dow booklet "Alkanolamine Soaps in Emulsions."

CHOICE OF FATTY ACID HAS STRONG EFFECT ON EMULSION VISCOSITY		CHOICE OF AMINE HAS LESS EFFECT ON EMULSION VISCOSI		
FATTY	VISCOSITY (cps) at 77°F.	AMINE	VISCOSITY (cps) at 77°F.	
Oleic	240	DIPA	3.9	
Palmitic	450	MIPA	8.0	
		MEA	12.0	
Stearic	2,000	TEA	230.0	

Mineral oil and water dispersions in 1:1 fatty acid-alkanolamine mole ratio of components. Table 1 at left uses TEA as the amine, Table 2 at right uses oleic acid. Both systems contain approximately 80 parts water, 15 parts oil, and 7.5 parts total emulsifier.

THICKENER

UNIQUE THICKENER HAS SURFACTANT PROPERTIES, EXEMPT FDA STATUS

Methocel[®], Dow methylcellulose, is an outstanding example of a synthetic methylcellulose gum that excels natural gums as a thickener and has valuable side properties as well. In addition to thickening, Methocel products are used as emulsifiers, emulsion stabilizers, suspending agents, and binders.

Methocel compounds are also unique in the class of gum compounds for their *surfactant* properties. Lowering the surface tension of water, Methocel is classed as a moderately active wetting agent. In many formulations Methocel acts as both thickener and surfactant.

ORGANIC COMPATIBILITY. One of the Methocel products—60 HG—differs from other synthetic or natural gums because of its solubility in both water and in organic solvents. High organic compatibility suggests its use for emulsifying a variety of aromatic and other organic materials. Another—Methocel 70 HG—has provided the answer to some of the problems encountered in the preparation of straight-chain hydrocarbon emulsions.

City

APPROVED FOR FOOD USE. Methocel products have been used as food additives for many years. Methocel MC, U.S.P., is generally recognized as safe for use in foods (Federal Register, 881, February 2, 1960). A food additive petition has been filed (No. 72) covering the use of the Methocel HG products in foods (Federal Register, 1690, February 26, 1960). Current use of the Methocel HG products is permitted under an extension of the effective date of the statute to March 6, 1961 (Federal Register, 1071, February 6, 1960).

LATEX THICKENER. Methocel products work exceptionally well with latexes as viscosity control agents, stabilizers, and plasticizer dispersants. Other uses for Methocel with latex are for adhesives, paper and textile coatings, dipped rubber goods, and paint.

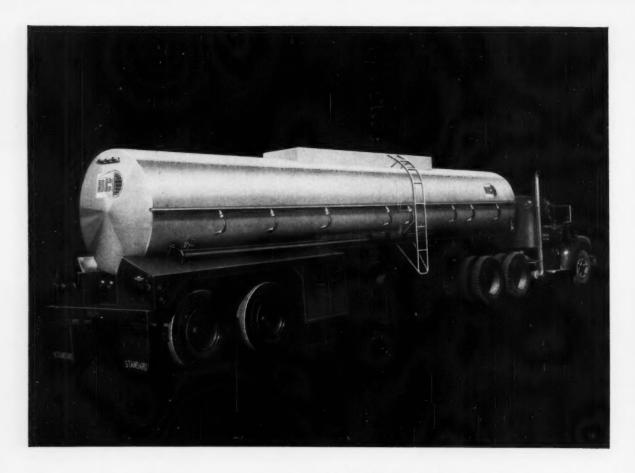
NEW GRANULAR FORM. A free-flowing, dust-free granular form of Methocel permits dispersion in cold water without lumping. It is especially useful in latex paint manufacture.

Chemicals Merc	cal Company, Midland, Michigan handising Dept. 425AM8-6	
	ne information on—Dow Alkanolamines	
Methocel – for food [for drugs & cosmetics [] for chemical processing [
Name		THE
Position	Company	THE
Address		

State

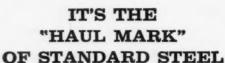


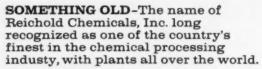
THE DOW CHEMICAL COMPANY Midland, Michigan



Something. Something.

IT'S THE "HAUL MARK"





SOMETHING NEW-This specially designed "Haul-Mark" transport tank of stainless steel, developed by Standard Steel for Reichold's Kansas City plant. Designed for various chemicals, it will transport Formaldehyde and Synthetic resins primarily. 4" of glass fibre insulation separates stainless inner shell and stainless wrapper. Steam can be introduced to the tank through unique manifold into special ring formers. Cabinets will carry four 650 lb. drums.

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HEADQUARTERS, ST. LOUIS PLANTS COAST TO COAST

Business

Newsletter

CHEMICAL WEEK August 6, 1960 Chemical business prospects are brightening for the last half of '60. Three factors—defense, Detroit, and demand—show promise for boosting second-half results relative to operations during the first six months: overall business is expected to get a shot in the arm from a speedup in letting of major defense contracts; steel, paint and other big chemical-using industries should pick up as Detroit's auto makers swing into production of '61 models; and consumer demand is predicted to keep rising with consumer income.

The past three months' grimmest challenge for chemical companies was in profit margins (see $p.\ 21$). Olin Mathieson, for example, came within \$2 million of the \$187 million sales record set in last year's second quarter, but net profits declined by nearly 10%, to \$10.1 million. Atlas Powder's second-quarter sales were off by less than 1%, to \$18.9 million, but net income was down nearly 20% to \$1.2 million. General Aniline lifted its second-quarter sales by 3.3%, to \$41.1 million, but earnings dipped by 8.6%, to \$1.9 million.

Signing of a contract for a uranium ore processing plant by Susquehanna-Western (Denver) with the Atomic Energy Commission still leaves two areas in the U.S. in which the AEC wants additional plants—North or South Dakota and Nevada. But no one else at this time seems eager to get into "yellow cake" uranium concentrate for the AEC. Susquehanna-Western's \$2-million plant will go up at Falls City, Tex., will be completed in about 10 months and will process 200 tons of ore per day. Susquehanna's contract runs to Dec. 31, '66.

Metals producers will be scrutinizing Dow's 1960 report—scheduled to be out within two weeks—to see how fast Dow's Metal Products division is growing and to try to spot indications of further integration. This week the company reports it has taken a six-month option to buy land, buildings and equipment of Sheet Aluminum Corp. (Jackson, Mich.) a producer of rolled aluminum products. Dow produces rolled aluminum and magnesium, and extruded and cast products at its Madison, Ill., and Bay City, Mich. plants.

At Dow's annual meeting last fall, President Leland Doan told stockholders Dow Metals Products Co. will go "aggressively into the fabrication of any metals we are equipped to handle." And dollar sales in the metals area was up 30% last year over the preceding year.

More growth ahead for plastics is pointed up by four expansions—both in intermediates and end-products:

 Allied Chemical's Plastics and Coal Chemicals Division is expanding its capacity for phthalic anhydride production. New facilities will be completed at the Philadelphia plant early next year, but capacity and costs were not disclosed.

Business

Newsletter

(Continued)

- Ground is being broken this week for Plax Corp's new container plant at Anaheim, Calif. The facility is to be located on an 18.5-acre site, will be engineered by Stiles & Robert Clements (Los Angeles).
- Westinghouse Electric Corp. will spend more than \$2 million to expand by 75% and to modernize the decorative plastic laminates facilities of its Micarta division. A new 6,000-ton, high-pressure laminating press capable of producing 5 x 12-ft. sheets will be installed. Present equipment can produce 4 x 10-ft sheets.
- Minnesota Mining and Manufacturing will build new facilities at Decatur, Ala., for production of its Kel-F chemicals previously made at Jersey City, N.J., and used in its halo fluorocarbon line of plastics, elastomers, coatings and other products. Also to be produced at the site: a line of specialty chemicals.

A stronger drive to export European petrochemicals is in the cards. Behind it is the pressure of mounting capacity. Last year producers in the nations of the Organization for European Economic Cooperation invested \$270 million in petrochemicals, and they plan to put \$800 million more into expansion during the '60-'62 period, according to a new report by an OEEC working committee. This will produce more capacity than can be used for the home market.

The European plastics boom accounts for much of this petrochemical growth. Western Europe, in fact, has almost caught up with the U.S. in plastics output. Total OEEC plastic sales last year rose 24%, according to the OEEC Plastic Materials Committee, to exceed the 2-million-ton mark. That compares with the 21% rise in U.S. sales, which totaled 2.3 million tons.

Germany topped the U.S. last year in per-capita plastics consumption, say the committee. West Germans bought 26.8 lbs. per person, while Americans consumed only 24.4 lbs. each. Following West Germany were Sweden, 21.6 lbs.; Denmark, 18.5 lbs., and the United Kingdom, 16.5 lbs.

More chemical ventures are in the works in Mexico. Reliable sources in Mexico's Italian colony now say Pemex, the government oil agency, has signed a deal with Societa Lavorazioni Organiche Inorganiche (Bologna) (see p. 25) for construction of a tetraethyl lead plant. It's a three-way venture, with ownership split between Pemex, SLOI, and a Mexican group. Instead of a sizable chunk of capital, SLOI will contribute all of its markets in Latin America—which will be needed to keep the plant operating at capacity. Earlier, Pemex had negotiated with Du Pont and Ethyl Corp. for a TEL plant, but Pemex reportedly turned away because each desired a private venture.

And Borden Chemical plans to form a joint venture with British Industrial Plastics Ltd. to produce amino-molding compounds in Mexico City. Each company will put up a half of the required \$800,000.



versatility (vur sa til'i-ti) n. The state of being capable of turning with ease from one task to another. Many-sided; able to do many things well; quality of being versatile.

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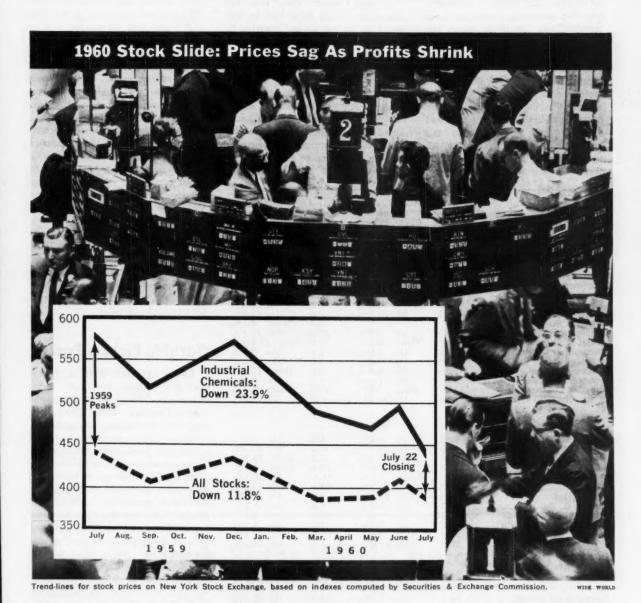
Makes you wonder how they used to have picnics. This current American pastime is filled with your practical applications for Jefferson Propylene Glycol and Dipropylene Glycol . . . reinforced plastics of the boat and water skis, sun tan lotion, flavoring in the soft drinks and food, brake fluids, printing ink, plastic tablecloth, cigarettes, beverage cooler insulation, and insecticide.

The very low toxicity of propylene glycol leads to its wide usage in foods, pharmaceuticals, and cosmetics. Dipropylene glycol is superior as a coupling agent or mutual solvent for normally immiscible liquids. It is most useful where a glycol of lower volatility and hygroscopicity is required. Both glycols are now available from Jefferson in the grades and quantity desired ... tank cars or wagons, or 55-gallon drums. For complete information or technical services, write to Jefferson Chemical Company, 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.



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JEFFERSON CHEMICALS



Chemicals Suffer More than Most

Although the U.S. chemical industry is at top financial and productive strength, chemical stocks last week were notably shaky in the bear market that has prevailed—except for occasional rallies—since early in the year.

By almost any index, chemical stock prices have declined more than the all-stock average since last year's July and December high points. By one index, the drop in chemical stock prices has been 23.9% during the past 12 months—double the fall in the all-stock average (chart, above).

But this merely means that—for the present, at least—some of the glamour that has attached to chemical stocks for the past 15 years has worn off. Leading Wall Street analysts, however, agree that for the long haul, chemicals are—and will continue to be—a better-than-average investment for both growth and dividends.

Nevertheless, these security analysts say, there are very real industry problems behind the sag in chemical stock prices. To a man, they point to the situation that chemical management has repeatedly acknowledged: vigorous expansion programs have resulted in more than adequate production capacity; increasing competition from domestic and foreign producers has kept chemical commodity prices static or crumbly; and rising production costs and ever greater set-asides for depreciation have generally crimped profits (table below).

Serious as these problems are, the financial analysts are confident that solutions will be found. In this regard, some say they already see signs of firmer prices, more realistic expansion planning.

Century Retrenches

Century Chemical (New York) has started its second fiscal year by cutting back its operations, deferring its main expansion project and lowering its sights on financial goals.

Century is now an active candidate for acquisition. President Theodore Hodgins—former Reichhold research vice-president who formed Century last year (CW, Jan. 16, p. 24)—says he has been negotiating with several nonchemical companies concerning possible acquisition of the firm.

Elimination of unprofitable items

from Century's product line has cut sales volume to about \$5 million/year, Hodgins told Chemical Week.
He estimates operations in the fiscal
year ended June 30 resulted in a net
loss of somewhat more than \$500,000; but predicts that an expected
increase in profitable sales will lead
to "a modest profit" in the current
year. Plans for building a benzene
nitration and chlorination plant have
been indefinitely postponed.

Century has moved its executive offices into new and larger quarters, taking over the entire fifth floor at 292 Madison Ave. in Manhattan. All major production operations—except the animal feed unit at Harrisonburg, Va.—have been consolidated in the main plant at Newark, N.J.

And Century has a new sales executive. Philip McLaughlin—formerly manager of technical sales and service with Stauffer Chemical—is now general sales manager. His predecessor was John Stevens, one of the company's founders.

	SALES		EARNINGS			
	1st half 1960*	Change 1st ha		1st half 1960*		nge from half '59
CHEMICAL COMPANIES				4		
Air Reduction	\$104.9	Up	3.1%	\$ 8.0	Up	1.9%
Canadian Chemical (1)	14.3			1.5		
Chemical Process	3.3	Up 2	6.0%	0.2	Up	10.9%
Commercial Solvents	34.4		5.9%	2.6	Up	91.5%
Du Pont of Canada	49.8	Up 1	1.9%	3.7	Up	0.4%
Foote Mineral	9.6	Down 2	6.6%	0.4	Down	59.8%
Foster Grant (11)	28.3	Up 2	4.2%	1.8	Up	43.8%
Freeport Sulphur (2)	-	_		6.4	Down	6.1%
Mallinckrodt Chemical	19.0	Up	9.5%	0.6	Up	18.4%
Metal & Thermit	19.5	Down	6.3%	0.6	Down 2	1.6%(3
Minerals & Chemicals	9.8	Up	8.5%	1.4	Up	9.3%
National Starch & Chemical	27.5	Up	6.0%	1.6	Up	2.6%
Nopco Chemical	20.6		5.4%	0.9	Down	13.0%
Spencer Chemical (4)	74.1	Up	1.5%	6.7	Up	0.7%
Stauffer Chemical	114.3	Down	2.4%	10.8	Down	0.7% 7.1%
Witco Chemical (5)	30.6	Up 1	5.2%	1.2	Up	19.4%
PHARMACEUTICAL COMPAN	IIES					
Abbott Laboratories	62.2	Up	6.4%	5.8	Up	4.0%
Baxter Laboratories	17.5		6.7%	1.2	Un	50.3%
Carter Products (6)	15.1	Down	1.3%	2.2	Down	18.1%
Merck & Co.	111.4	Up	0.6%	14.8	Down	6.7%
Parke, Davis	99.0		9.1%	15.1		10.1%
Pfizer	136.8	Un 1	1.3%	12.9	Un	13.2%
Plough, Inc.	23.5		8 %	1.6	Un	32 %
Searle, G. D.	18.3	Up	6.0%	3.9	Up	5.1%
Smith Kline & French	72.9		9.2%	12.1	Down	
U.S. Vitamin & Pharm'l.	7.2		0.2%	1.0	Up	1.9%
Upjohn	76.5	Up	5.8%	10.5	Up	7.1%
Warner-Lambert	98.0		1.8%	7.5		10.9%
OTHER CPI COMPANIES						
American-Marietta (7)	160.9	Un 1	2.7%	9.2	Down	2.2%
Carborundum	59.9	Up	2.5%	4.3	Un	16.6%
Consolidated Mining	64.3	Up	2.3%	13.3	Up	55.2%
Ferro Corp.	32.9		3.9%	1.7	Down	3 AO/
Glidden Co. (8)	145.9	Up	1.0%	4.4	Down	14.3%
Hagan Chemicals	20.0	Un 1	0.2%	0.9	Up	5.1%
Interchemical	64.8	Up	4.2%	3.3	Down	2 70/
McKesson & Robbins (6)	163.6	Up	1.7%	2.0	Down	23.80
Minnesota Mining & Mfg.	263.0	Up 1	0.8%	32.4	Un	23.8%
National Distillers (9)	280.7	Up	0.8% 3.8%	11.7	Down	0.4%
National Lead	269.9	Un	2.0%	25.3	Down	5.7%
Pittsburgh Plate Glass (10)	324.0	Up 1	5.8%	25.7		28.5%
Rayonier	69.6	Up	5.8% 5.9%	5.9	Down	11.1%
Rexall Drug and Chemical	112.3	Up 1	4.9%	3.6	Lin	11.8%
Sun Chemical	29.0	Up 1	0.2%	0.6	Up	7.8%
Texas Gulf Sulphur	29.1	Down 1	1.8%	6.1	Down	12.1%
U. S. Rubber	510.2	Up	0.3%	18.5	Down	2.4%

3. All dollar figures in millions. (1) Company was not publicly owned last year. (2) Sales data not reported. (3) '59 income restated for depreciation changes. (4) For fiscal year ended June 30; including data for recently acquired Pittsburgh and Midway Coal Mining Co. (5) '59 sales and income restated to include data for British subsidiary, now consolidated. (6) For three months ended June 30. (7) For six months ended May 31. (8) For mine months ended May 31. (9) '60 sales and earnings include May and June data for Reactive Metals Inc., now 60% owned. (10) '59 Sales and earnings affected by strike. (11) For nine months ended July 3.

Carbide Picks a Prexy

Taking over this week as Union Carbide's seventh president: Birny Mason, Jr. Mason is a 51-year-old chemical engineer whose 28-year career with the nation's second-largest chemical concern includes experience in research, production, industrial relations, development, and finance.

He succeeds Howard S. Bunn, 61, who—after two years as president—now moves up into the newly created position of vice-chairman of the board. Chairman Morse Dial will continue in his capacity as chief executive officer.

Mason went to Carbide's chemical research unit at South Charleston, W. Va., right after his graduation from Cornell. There he took part in some of the early work on separation and purification of butadiene.

Because of that experience, Mason was named assistant superintendent of the butadiene plant built at Louisville, Ky. This managerial assignment started him on his way to the top. Way-stations along that road: corporate secretary, first president of Union Carbide Development Co., corporate vice-president, member of the appropriations committee, and executive vice-president.

a land a second of	Carbon Blac	ck's Internatio	nal Ga	ins	
	(Western World ex	ccept U.S. and Canada-million	n pounds/year)	•	
	1959 Estimated Consumption	Present Producers	1959 Estimated Capacity	Companies with Expansion Projects	1962-63 Estimated Capacit
South America					
Argentina	20			Cabot	50
Brazil Mexico	33 19	Columbian Carbon	30	Columbian, Colloida Carbon of Brazil	80
Others	26			Phillips	20
	98		30		150
Asia, Africa, Pacific					
Australia	44	Australian Carbon Black Pty., Ltd. (a United Carbon-Ca	1	71-	25
India	26 77	bot joint venture)		Cabot, Phillips	60
Japan	77	Several Japanes		Cabot, Phillips, Con	
		firms making off grade blacks	40	tinental Carbon, Col umbian Carbon	110
South Africa	29	grade blacks	40	Phillips	20
Pakistan Others	31			Continental	30
	207		65		245
Western Europe					
France	133	Cabot	80	(2) United Carbon (2) Phillips To (1) Cabot	otal 180
West Germany	137	Degussa	145	Degussa	160
Italy	63			(2) Continental-Col umbian joint ventur (2) Cabot To (2) Phillips	
Netherlands	18			(1) Continental-Columbian (1) Ketjen T	otal 80
United Kingdom	162	United Kingdor Chemicals Philblack Ltd. Cabot		All present productions of the completed plant.	300
Others	92			construction. All of planned or announced	ners are I.
	605		485		830
			580		1,225

Carbon Black Rides World Auto Boom

The worldwide boom in carbon black is evident again. This week: Godfrey L. Cabot (Boston)— largest U.S. producer—is planning immediate startup of its Ravenna, Italy, facility. And in the U.S., Sid Richardson Carbon Co. (Forth Worth, Tex.) gelled plans for a 50-million-lbs./year oil furnace carbon-black plant—its first departure from natural gas-produced channel blacks.

These are only two of a dozen plants under construction or being blueprinted all over the world that underscore the tremendous growth surge for a raw material vital to tire and rubber mechanical goods manufacture.

Richardson's oil furnace-black plant—to go up at Big Springs, Tex.—will use processes developed by United Carbon Co. (Houston), second-largest U.S. producer. These are the same processes United Carbon now plans to install in a \$5-million, 50-million-lbs./year plant to be completed near Rouen, France, in '61 for a subsidiary, United Carbon France, S.A.

According to John Bahm, United Carbon's international sales manager,

just returned from an on-the-spot survey in Europe, that continent's consumption of rubber — and thus of carbon black as well—may even exceed its current growth pace. Already the European growth rate is twice the U.S. rate, and it is climbing as more Europeans buy cars. The underdeveloped countries in the rest of the world, Bahm adds, are solving transportation problems—not with more trains, but by turning to automobiles.

Results (table, above): carbon-black consumption in non-Communist coun-

tries other than the U.S. and Canada is now predicted to be about 1.2 billion lbs. by '63 (last year it was 910 million lbs.). And this area's combined capacity now is being readied for a jump from last year's 580 million lbs./year, far below needs, to a whopping 1,225 million lbs. by '63.

U.S. capacity, too, is being hiked, to meet a predicted consumption increase of about 8% over last year's 2 billion lbs. This hinges on a continued rise in sales to rubber companies, which consume 90% of the carbon-black output.

Flexibility in Demand: While some industry people fear there's an overcapacity, carbon-black producers explain: (1) several types of carbon black are made, and a company must be geared to produce one readily and in any quantity desired, if it is to serve ever-changing demands of its customers; (2) excess capacity makes possible operation with lower inventories; and (3) there's no threat to prices, as carbon-black tags have remained stable for years.

Faced with dynamic growth—especially in the foreign field—capacity is deliberately being pushed well ahead of demand. Most recent U.S. expansions: Continental Carbon has brought up to 70 million lbs./year the capacity of its Westlake, La., unit; and Phillips Chemical will start up its 60-million-lbs./year furnace-black unit at Orange, Tex., next December.

Seven in Oil Blacks: Richardson will join six other U.S. firms producing oil furnace carbon blacks (at a total of 16 plant locations). It is already one of the eight major domestic producers of carbon blacks, which make up the biggest segment of black sales-a little more than 2 billion lbs. in '59. Of this total, oil furnace blacks comprised 52%; gas furnace blacks, 32%; channel blacks, 16%. Major investor-owned producers in the U.S.: Cabot, United Carbon, Continental Carbon (an offspring of Witco Chemical, Continental Oil and Shamrock Oil & Gas), Phillips, Columbian Carbon and Thermatomic Carbon Co., a division of Commercial Solvents. J. M. Huber, like Richardson, is privately owned.

While most of these companies are now producing both channel and furnace blacks, the switch to the oil furnace process is exemplified in



United Carbon's Bahm: Still faster growth abroad, as tire market grows.

Richardson's projected plant, which will draw its crude oil feedstock from the adjacent Cosden Petroleum refinery.

Up into the '40s, the channel process was the sole commercial source of carbon black. Now channel blacks' prices trend upward as natural gas becomes more valuable in other applications.

Moreover, the spread between gas and oil costs is increasingly making itself felt. Recent example: prices of channel blacks—long at the same levels as those of furnace blacks—went up.

Top Year for Export: Due to the buildup in carbon black plants abroad, U.S. producers face the prospect of a dip in exports. According to a recent survey, '60 will be their top year for exports—about 530 million lbs., vs. 515 million lbs. last year.

The U.S. export total is expected to drop off to about 470 million lbs. by next year, then slowly slide to 270 million lbs. by '63 as production in countries outside the Communist camp swells to 900 million lbs./year. If these predictions prove accurate, the Western world other than the U.S. and Canada will then be producing 77% of the projected 1,170-million-lbs./year demand.

While the current slackening of the European business boom could herald a slump, U.S. carbon-black producers remain cheerful about their industry's outlook, feel there's every reason to count on continued brisk sales.

Moving into Colombia

McKesson & Robbins, which earns its \$677-million/year sales largely by distributing drugs, chemicals and liquor in the U.S., will soon become a major manufacturing force in Latin America.

The company is wrapping up a deal that will give it half interest in the Colombian plant of Germany's Schering and half interest in Droguerias Aliadas, S.A., of Colombia, reportedly the largest manufacturer, wholesaler and retailer of ethical and proprietary drug products in South America.

According to a top M&R executive, the acquisitions will provide a "nucleus" for expanding production of products such as industrial and agricultural chemicals, veterinary products, and pharmaceuticals.

Under a contract already signed, M&R paid Aliadas about \$4.5 million for half interest in its wholesale and retail operations and will pay an undisclosed sum for half interest in its manufacturing operations after an auditing is completed.

Aliadas and M&R already are associated in Calox International, which operates wholesale outlets for drugs and sundries in Ecuador, Panama and Colombia. Aliadas also operates Laboratorio Uribe Angel, a major proprietary drug producer; Laboratorio Cup, the biggest ethical-drug producer in Colombia; produces Max Factor and Helena Rubenstein cosmetics in Bogota; owns 11 wholesale drug houses and 103 stores throughout Latin America.

England Stands Pat

After a few months of "agonizing reappraisal" — and despite pressures from important business groups, the press, and within the Cabinet itself—the British government firmly stated last week that it plans no move to enter the European Economic Community (the Common Market), and accepts the division between Europe's two trade blocs as inevitable for the time being.

The British decided they would rather buck trade discrimination by the six-nation Common Market than disrupt the preferential tariff relationship with the other members of the Commonwealth.

COMPANIES

American Can Co. (New York) and Wheaton Glass Co. (Millville, N.J.) are organizing a joint subsidiary, American-Wheaton Glass Corp., to produce glass containers. First plants will be at Terre Haute, Ind., and Minneapolis, Minn.; additional plants are to be built at other locations "as warranted." American is a major producer of metal cans; Wheaton has specialized in production of glass containers for cosmetics and pharmaceuticals.

Reliance Varnish Co. (Louisville, Ky.) has borrowed \$1.2 million in a 5.75%, 10-year term loan for use in purchase of Coast Paint and Lacquer Co. (Houston, Tex.). The lenders: Mutual Life Insurance Co. of New York and Louisville Trust Co.

California Corp. for Biochemical Research (Los Angeles) has formed Calbiochem Caribe (Arecibo, Puerto Rico) as a subsidiary to extract various products from rum distillery slops known as "mosto." The research staff will also search for new biochemical byproducts from other agricultural materials in Puerto Rico.

Vitro Corp. (New York) has a new defense contract. The U.S. Air Force has awarded a \$7-million contract to Vitro's Vitro Laboratories division for operation and maintenance of the Eglin Gulf Test Ranges, near Key West, Fla., through June 1961. EGTR is used in evaluation of new weapons systems and for missile research and development.

American Mineral Spirits Co. and Record Chemical Co. are moving their headquarters. New addresses: AMSCO—200 South Michigan Ave., Chicago; Record—840 Montee de Liesse Rd., Ville Saint-Laurent, Que.

EXPANSION

Chemicals: Nalco Chemical Co. (Chicago) is purchasing an additional 10 acres of land and four buildings in Chicago's Clearing Industrial District. These acquisitions bring Nalco's land holdings in that area to 25.1 acres. The buildings will be modernized and converted into laboratory, office and manufacturing facilities. Purchase and conversion costs are expected to total about \$1 million.

Phenolic Resins: Reichhold Chemicals, Inc. (White Plains, N.Y.) is about to start construction of a plant to produce phenolic molding compounds at Carteret, N.J. This 25 million lbs./year plant—to be completed by early next spring—will be located on a 40-acre waterfront tract recently purchased from U.S. Metals Co. RCI expects to use this site for other chemical plants.

Tin and Tin Chemicals: M&T Products of Canada Ltd. (Rexdale, Ont.) plans to build a de-tinning plant in the Hamilton area for production of tin, tin chemicals, and high-grade steel scrap. The plant is to be in operation next year. M&T Products—a subsidiary of Metal & Thermit (New York)—recently changed its name from Metal & Thermit-United Chromium of Canada, Ltd.

Chlorine: Stauffer Chemical (New York) has started engineering work on a chlorine plant to be built by late next year in the Wilmington area, near Los Angeles. Total chlorine output will be supplied to American Chemical Corp.—jointly owned by Stauffer and Richfield Oil—for use in production of vinyl chloride, ethylene chloride and ethylene dichloride. The coproduct—not identified—will be consumed by Sauffer.

Polyester Resins: American Alkyd Industries (Carlstadt, N.J.) has purchased a 10-acre tract at Carpentersville, Ill., as a site for the company's third plant for production of synthetic resins. The new plant—scheduled to begin operation in the last quarter of 1960—will produce polyester resins for the plastics industry and other synthetic resins for use in paint and varnish.

FOREIGN

Minerals/Mexico: American Metal Climax (New York) has sold majority interest in Cia. Minera de Penoles—Mexico's second largest mining concern—to a group of Mexican banks, investment houses and individuals. It's expected that similar moves may be made by U.S.-owned sulfur companies and other foreign mining ventures in Mexico, inasmuch as a new law to promote "Mexicanization" of the country's mining industry is slated to be announced next month.

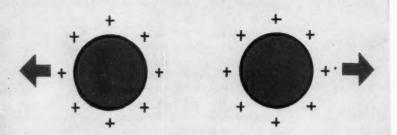
Rockets, Propellants/France: France's leading rocket company, SEPR, has signed a 10-year agreement with North American Aviation's Rocketdyne Division and reportedly is negotiating a contract with Thiokol Chemical (Bristol, Pa.). The Rocketdyne pact covers European sales rights on Rocketdyne's small, liquid-fuel rocket engines and U.S. rights on SEPR's liquid-fuel engines. The proposed Thiokol agreement would bring SEPR into solid-fuel propulsion—a field that until recently has been left to the French government's Service des Poudres. SEPR is jointly owned by four French chemical companies and two aircraft companies.

Tetraethyl Lead/Mexico: Petroleos Mexicanos (PEMEX)—the government-owned oil and petrochemical monopoly—is planning a joint venture with Italy's Soc. Lavorazioni Organiche (Bologna) to produce tetraethyl lead in Mexico. Up to now, the Italian company has supplied Mexican TEL requirement.

Charge-Breaker Brings Down

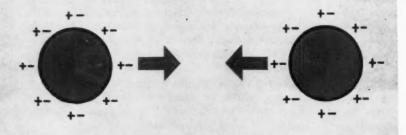
Zeta potential is key to...

The surfaces of colloid particles carry an electric charge called zeta potential. Because of their zeta potential, colloid particles repel each other and will not coagulate.



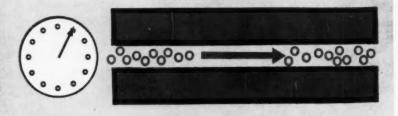
... Precipitation of colloids

When the zeta potential is known, cationic and anionic polyelectrolytes can be added to neutralize it. This allows the colloids to coagulate.



Found: a way to measure zeta potential

The zeta potential makes colloid particles migrate under an electric force. The Riddick cell measures the zeta potential by timing the rate at which particles migrate through a hole in a block of clear plastic.



A month-old water-treating plant at Waterford, N. Y. (near Albany), is demonstrating that continuous control of electrokinetic charge, known as zeta potential, has finally been added to the chemical processor's kit of tools.

Zeta potential exists at the interface between all solids and liquids and is the critical factor in precipitation of colloidal particles. At Waterford, it is harnessed to convert Hudson River water into clear drinking water. Its use is not limited to water treatment, however, but extends to any process in which colloids are stabilized or settled out.

Design Savings: The potential savings thus opened up for chemical processors are tremendous if the Waterford plant is taken as typical. This one operation has given rise to optimistic speculation about the possibility of cutting investments for water-treating plants from about \$230,000/million gallons to about \$140,000/million gallons.

These savings stem entirely from reduced equipment sizes, compared with those of conventional plants. In both the new and conventional plants, operations parallel each other through three basic steps: (1) kill bacteria and other living organisms, (2) agglomerize and precipitate the suspended colloidal matter, (3) filter out anything that can't be precipitated and then add secondary chemicals for sterilization.

In step one, the zeta potential and conventional processes are about the same. Raw water is pumped from a source through chlorine injection and a mixer into an aeration basin, where air is bubbled through or the water sprayed over a pond. In this step the size of the aeration basin or spray pond depends simply on the type of system.

Savings begin, therefore, with step two, which involves a complicated series of chemical reactions to cause colloid flocculation and fast settling. In conventional processes large quantities of chemicals — e.g., activated silica, alum and ferric chloride—are mixed with the water under pH control to form the floc. Flocculation oc-

Colloid Control Costs

curs in basins, where large heart-cut redwood paddles stir the water to promote particle collisions. Finally, conventional plants overflow the water with agglomerized floc into large settling basins (up to 24 hours' holdup).

In contrast with this, step two in zeta-potential control utilizes fewer agglomerizing chemicals, or none at all, and depends on neutralizing the charges with polyelectrolytes. Since this is more efficient, both the flocculation basins and the settling basins can be smaller.

Step three is the same for both systems—filtration through a 1- to 3-ft.-thick bed of sand and final chemical sterilization in a clear-water basin. Zeta potential control should be able to save money on sand filters, although the Waterford plant hasn't been running long enough to prove the reduced designs. But the reduced quantities of agglomerizing chemicals will make the filtration job easier.

The new designs can be applied to water-treating plants that have a total annual investment of over \$100 million. Impact on the many processes involving colloids are impossible to foretell, but should be proportional.

How It Works: Key to the process is a novel electrophoresis cell developed by T. M. Riddick & Associates (New York). The Riddick cell permits fast readings of colloid zeta potentials in a control laboratory—by timing the rate at which colloid particles migrate under an electric force.

Actual zeta potential control is by a series of reactions in which highmolecular-weight polyelectrolytes and surface-active agents are used to bring the zeta potential to zero.

The Riddick cell employs a visual micrometer grid of horizontal and vertical lines etched onto the right-eye lense of a spectroscopic microscope. During the electrophoretic migration, particle speeds—and thus zeta potential—are measured by timing the rate at which they pass the grid. A standard cell is used to hold the solution. It is a block of clear plastic, drilled with a ½-in.-diameter

hole, and with two thumb-size reservoir cups located 10 centimeters apart along the hole. The standard dc. voltage is applied to the liquid in the cups.

Riddick doesn't fear that his cell could be reproduced by anyone who didn't want to respect his patents. "The length to diameter ratio of the hole is too big," he says. "It took me 18 tries and thousands of dollars to make three cells. The only practical solution is some mass-production technique." He is currently negotiating this.

In the treatment process, Hudson River water is first disinfected by chlorination, and then aerated for 20 minutes by submerged air spargers in a large aeration basin. Addition of floc-forming materials, such as activated silica, alum, or ferric chloride, comes next, and they are mixed in by aeration in basins with 3.5 minutes' holdup time.

From the mixing basins, the water passes to the heart of the zeta potential control process—a flume divided down the center with a solid baffle. Cationic polyelectrolyte is added on one side of the baffle, while anionic is added on the other. In this manner, the zeta potential is controlled on each side of the flume, so that when the two sides recombine it is zero.

From the zeta potential flume, the water passes into flocculation basins, where rotating wire-mesh paddles speed agglomerization. Side-flow baffles lead from the flocculation basins into a large sedimentation basin, where the water has three hours to settle, before passing through sand filters to a clear-water basin and the distribution system.

Control of water coagulation (and of many industrial precipitations) is currently done on the basis of acidity, or pH. This, because many colloids such as starches and proteins (which are attracted to water and form hydrates) will vary their zeta potential according to the acidity of the solution. The pH at which these colloids have a zero zeta potential is known as the isoelectric point, and the isoelectric point has been tabulated for many substances such as gelatin, blood



Precipitating colloids by pH is like . . .



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ENGINEERING

hemoglobin and albumin.

Besides pH control, most watertreatment plants use various gels and adsorbents, such as silica and powdered clays, to promote coagulation. These must be evaluated for each type of colloid, however—either by trial and error or by visual jar-shaking tests—and they are too clumsy for easy operation.

But colloid coagulation is a direct function of low zeta potential alone, and pH control is only a partial means to this end. According to electrophoresis expert Riddick, zeta potential offers complete control, faster and cheaper.

PROCESSES

Gas Shapes Metals: Explosive metal-forming (CW, Aug. 8, '59, p. 75) gets a new lift by an electrolytic gas cell developed by Battelle Memorial Institute. Key to the new process: flat nickel-plated steel electrodes in a plastic or insulated metal container. The cell generates an oxygen-hydrogen mixture capable of multiplying pressure 10 times through explosion and producing temperatures above 2000 C. Flame temperatures, controlled by varying the moisture content of the gases, are hot enough to cut and weld steel, aluminum and nickel, and to melt platinum or fuse alumina. Estimated cost of producing the gas is 10-30¢/100 cu. ft., compared with 25¢ to \$1.59 for producing the same quantity of gas by usual methods.

Fertilizers: A calcium cyanamide fertilizer process developed by Societe Belge d'Electrochemie (Ghent, Belgium) has cut product losses 80% and has also reduced heat requirements. Key: pressure in the nitrogenation vessel is raised from one atmosphere to between 70 and 100 atmospheres. High pressure also reduces the vessel's heat requirements 75%, ups capacity six-fold. Reactions remain the same-electrothermic smelting of lime with coke to get calcium carbide, which is powdered and catalytically reacted with nitrogen to form calcium cyanamide.

Portable Reactor: The world's first portable nuclear reactor has been shipped from Buffalo, N.Y., to Camp Century, the Army's Polar Research and Development Center at Thule, Greenland. The reactor, which needs loading once a year with fully enriched uranium fuel transported in eleven 55-gal. drums, will do the job of a diesel power plant requiring 55,-000 drums of fuel annually. Cargo will be snow-trained 100 miles inland, assembled in deep trenches, encased in corrugated steel roof structures and covered with a layer of snow. The \$3.2-million reactor weighs 290 tons, is the result of 21/2 years of research and production work at Alco Products Inc.'s Thermal Products Division plant at Dunkirk, N.Y. It was designed as a prototype and could have been transported by air, but special railroad cars moved it to a ship at Buffalo at a fraction of the cost of air shipment.

Powder Metallurgy: A unique process for electron tube manufacture, utilizing compacted metal powders of closely controlled composition, has been developed by General Telephone and Electronics Laboratory for Sylvania Electric Products Inc. New twist is to use high-purity nickel or nickel alloying powders, pack them (CW, Feb. 27, p. 95) and roll them into strips from which cathodes are formed. The conventional method is to melt and cast cathode materials from ingots. The use of powders enables accurate control of additives and alloys; provides uniform electrical characteristics, improved high-temperature strength, and a more reliable product.

Atomic Wastes: An incinerating process is saving 75% of radioactive material disposal costs at General Electric's Atomic Power Equipment Dept. (San Jose, Calif.). The incinerator consists of three basic units: a high-temperature furnace box, which completely burns all combustible material; spray cooling equipment; and filtration system, which traps all radioactive particles in exhaust gases, is designed to stop even bacteria. Key to the system is the water spray unit that cools the gases to a temperature at which they can be filtered without damaging the filter. The ashes-10% of the original volumeare handled by routine methods. Once removed from the incinerator, they are encased in concrete containers and dumped in special areas.

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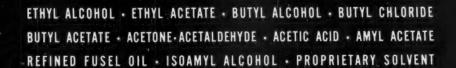


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Washington

Newsletter

CHEMICAL WEEK August 6, 1960 No push for big new legislation is expected in the August session of Congress. (The Senate resumes Aug. 8, the House Aug. 15.)

An effort to enact new farm legislation, military expenditures, or anything of such a comprehensive nature would probably flop. There are too many parliamentary hurdles and too much in-fighting to be overcome in the approximately three weeks of work. Therefore, the August session will probably be limited mostly to wrapping up bills already in the final stages of enactment.

The four big issues waiting to be settled are all hot ones for the campaign, and both parties will try to emerge "looking good" on these points:

Minimum wage: The Democrats' platform pledges \$1.25/hour; the Republican program promises an unspecified increase from the present \$1; both pledge extension of coverage to "several million workers." The House has voted a \$1.15 minimum with limited extension of coverage. Kennedy's committee has endorsed \$1.25 and extension to about 4 million workers. A bill will be passed, but what kind is very much up in the air.

Medical aid: The parties are so far apart on medical aid that it's doubtful if Congress can act. The Democratic party platform promises aid for the aged under the Social Security System, which the Senate is most likely to favor. Republicans call for subsidies to help very low income groups, and the House has passed a bill to this effect. Eisenhower would veto a social security-based measure. This could be the hottest domestic issue.

School construction: The House Rules Committee is blocking a conference on differing Senate-House bills, each providing about \$1 billion in grants to be matched by states. But chances of passage and Presidential signature are fairly good.

Housing: Bills providing about \$1.5 billion for urban renewal and college housing have passed the Senate but are blocked in the House Rules Committee. Chances favor passage of some bill.

Democratic strategy will be to pass strong measures in all these fields, almost hoping for a Presidential veto. Choice of Johnson for the ticket greatly strengthens Kennedy's hand in pushing these bills. Johnson can be especially helpful in persuading House Speaker Sam Rayburn to put the squeeze on the Rules Committee, which is the biggest hurdle for all these bills. Rayburn was Johnson's campaign manager.

Republican strategy will be to either (1) pass watered-down versions of these bills, which Eisenhower will sign and which Republicans can claim credit for, or (2) kill the bills in parliamentary maneuvering that will obscure the blame for their deaths.

Washington

Newsletter

(Continued)

In any event, the Senate may provide a bitter spectacle. Five of the principals in the campaign will be there with knives sharpened: candidate Nixon and the GOP's national committee chairman, Sen. Thruston Morton of Kentucky; candidates Kennedy and Johnson and their national chairman, Sen. Henry Jackson of Washington.

The drug industry will spend \$214 million on research and development this year—a new record, according to a survey by the Pharmaceutical Manufacturers Assn. In '59 expenditures hit \$197 million, a 16% increase over '58. More than \$18 million was spent outside the companies on research in medical schools and institutions. The biggest chunk of research was in cancer chemotherapy, the next biggest in allergies and infectious diseases.

L'affaire Newberg at Chrysler may bring on new regulations by the Securities & Exchange Commission on reporting of outside financial interests of corporate executives.

SEC is currently investigating whether any laws were broken by the Chrysler official's heavy investment in supplying companies. Lawyers feel that William C. Newberg was probably within legal bounds because the transaction involved less than 15% of Chrysler's business, although there are other technicalities involved that leave the case unclear.

At any rate, if it appears that no laws were violated, SEC is bound to propose new regulations to require fuller disclosure of outside interests by an official, especially where big companies are involved. Fifteen percent of Chrysler's business, after all, is big money.

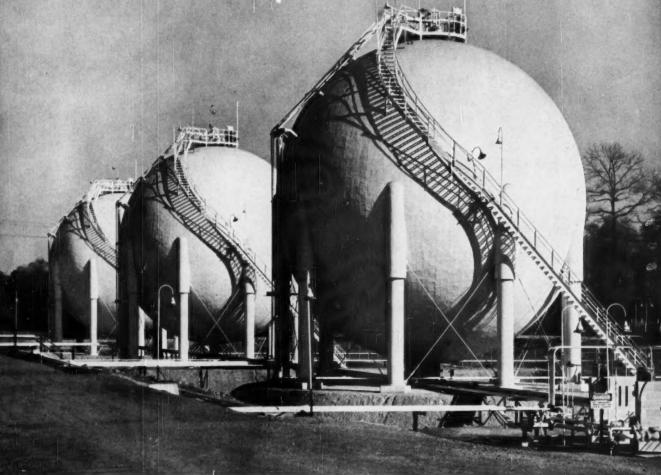
Congress may get into the act, too, although probably not during the August session. A probe of corporate officers' holdings would revive interest in the question of business morality just at a time when the din over TV rigging is dying down.

Presidential discretion in dealing with Tariff Commission recommendations in escape-clause cases has been challenged by a decision in the U.S. Court of Customs and Patent Appeals. The court, in its recent ruling on a '58 bicycle tariff case, holds that the President may only accept or reject tariff commission recommendations for giving tariff relief to domestic producers. He is not free, the court says, to alter the agency's recommendation on how high to boost the tariff. Government lawyers say the '58 trade law shows that Congress recognizes the President's discretionary right to rewrite commission suggestions. The government may appeal the ruling.

As expected, AEC is appealing for Supreme Court decision on its authority to use a construction permit for an atomic reactor and not rule on its safety until later. A U.S. court of appeals had ruled against AEC's procedure in licensing the P. R. D. C. reactor in Lagoona Beach, Mich, (CW, June 25, p. 28.)

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Closing the circuit: CPI computer users plug in leads to new jobs



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Electronic brainpower is finding new nontechnological work. Result: jobs for computers, in functions ranging from marketing to production to vacation scheduling.

Computers: Jacks of New Trades

Computers and data-processing equipment are being turned increasingly by chemical process companies to jobs less and less related to the solution of strictly technological, engineering or scientific problems. This week, for example, at least one chemical company is planning vacations according to a computer-devised schedule. But there are a host of other novel computer uses, a new CKEMICAL WEEK survey shows, all developed by firms trying to make best use of their computers.

This expansion of computing and data-processing horizons stems from several factors, the roundup shows. First is that companies which jumped on the early computer bandwagon became somewhat disillusioned—dramatic clerical savings from data-processing equipment failed to appear—and began looking for widened uses to which they could put the expensive equipment.

Second is the payoff of training programs to encourage middle and top management to seek out new problems and areas of machine usage.

Third, the development of new machines and new combinations of machines, coupled with intensive proselytizing by the leading machine makers, has widened familiarity with computers, even among those without the equipment. In addition, there are business-hungry computer service centers that rent computer time at reasonable fees and have widened markets.

Fourth, and probably most important, is the realization by management that the use and application of computers can lead to economies in areas outside the highly technical ones. Tied to this is the awareness that computers do not require the services of superspecialized personnel for programing and operation. Now more companies are using or planning to use some form of these devices.

They'll find plenty available. Today, it's possible to buy a computer for as much as \$10 million or to rent one for as little as \$10 a month. Expectations for increased use are such that industry observers expect the sales and rental of electronic dataprocessing equipment and services to rise from \$1.8 billion for '60 to \$10 billion by '70, a more than fivefold increase.

Company Uses: Nontechnical applications break down into three main categories, and share computer time about equally with technical applications, the load running between 40% and 60% nontechnical. The categories:

- Routine recordkeeping and analysis in which standard day-to-day information is recorded and summarized, and from which sets of figures are regularly compiled and categorized.
- Special studies, on either a regular or one-shot basis, are made in proscribed areas from information especially compiled for them.
- Miscellaneous applications, outside the scope of the other two categories.

Routine: By and large, companies are well along in using computers for routine accounting work. Almost all those contacted by CW use them to summarize daily, weekly or monthly sales and income figures. A good many have reduced payroll accounting and checkwriting to machine procedure. Additional accounting uses include cost accounting, invoice auditing, distribution of overhead expenses, depreciation and tax calculations, stockholder accounts and similar activities.

Other routine recordkeeping is also done by the machines. Personnel records are often kept on punch cards, as are company service records, pension accounts and savings plan statements. In many firms, machines handle order and invoice statements, keep track of inventories, product shipments, and storehouse supplies.

Special Studies: Many companies are using their machines to provide information over and above that appearing in conventional form. Du Pont's Treasurer's Dept., for example, regularly uses routinely collected accounting information to analyze product or product-line profitability, passes this along to operating departments requiring it.

Hercules Powder, Du Pont, and International Minerals are among major companies that use computers for market forecasting. IMC also reports it has used them for plant location studies by feeding into the machine such relevant data as transportation, raw-material and operating costs, distance to potential markets, and the like. The machine compiles alternative choices describing desirable areas in which a plant could be located.

Several companies report the use of computers for production scheduling. These are mainly instances where production of a number of related products comes from a manufacturing complex. Oil refineries, in particular, says International Business Machines' oil specialist Tag Gilbert, are applying this technique. Purpose is to schedule the most economical refinery runs so that factors such as material avaliability, prices, demand and inventory can be used on an hour-by-hour basis to optimize manufacturing. Abbott Laboratories says it, too, uses computers for production scheduling.

A related use of production information in computers is the determination of plant performance and profitability. Oil companies use this widely, and chemical companies such as IMC, Du Pont, Dow Chemical,

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ADMINISTRATION

Hercules and others report similar applications.

Profitable Example: At International Minerals, management uses computers for "profit planning." To do this for an operating division, the company tabulates information such as pounds of raw material in a product, cost for each element of raw material, cost of production, and projected sales prices and plans. With this information the machine derives both monthly and yearly profit projections, which can be used as guides for setting operating standards and measuring performance.

At Standard Oil of California computers have been used to run sales correlations in consumer marketing studies, to see if changes in designs, packaging, colors, and other elements of service station operation can be correlated with changes in sales.

Unusual Applications: Several companies report activities not ordinarily undertaken. At Monsanto, for example, computers are used for management training via "total enterprisetype games." In these, four management trainees are assigned to each of five teams, or "companies." Each team decides on officers and makes decisions on the structure and operations of its company, all of which are fed to the machine. At game's end, the computer reports on the final position of each team as its decisions were affected by given economic conditions.

Dow Chemical, at Pittsburg, Calif., has used its computers to make a detailed study of hourly workers' vacation schedules, time off, and other employee absenteeism data. Purpese: to pinpoint how changes in benefit plans involving time off may affect operating costs. Moreover, it helps show optimum operating conditions with respect to scheduling vacations, time off, shift work, overtime, etc.

Still another study Dow is making involves classification of all accidents in its plant. This is being done to see if there is any correlation in the variables of cause, place, age of person, time of day and others in the hope of eliminating or improving unsafe combinations.

Research: Even with all these nonprocess applications of computers, companies are searching for more. They're looking into such things as research planning, and economic forecasting. Of particular interest is the field of industrial dynamics, which involves the simulation of operations as they actually exist at any moment. Thus production scheduling, for example, would be done on a computer analogy of the actual plant as it is at any given time, rather than on an analogy of it in a state of equilibrium such as most such studies assume.

With such new research coming along, and with applications already in use, it's evident that many chemical process firms are relying heavily on computers for assistance in making management decisions. For the future, it's a pretty sure bet they'll be relying on them a lot more—particularly when machines more accurately simulate complex situations.

LEGAL

Soap Samples: Procter & Gamble has been forbidden by the Federal Trade Commission to give away its products. The company had made unlimited, exclusive contracts with the manufacturers of automatic washing machines and dishwashers to pack samples of its detergents and soaps, Tide, Dash and Cascade, in new machines. FTC said that P&G had held "a complete monopoly" of this promotion technique since 1957.

The company, without admitting violation of the law, agreed to a consent order that specifies that in future contracts the manufacturers will be held to using P&G products exclusively for no more than 90 days. Packages must be labeled to show that products are supplied free, on P&G's initiative, and do not represent manufacturers' endorsement.

Cutter Case: Award of \$147,300 in damages and court costs against Cutter Laboratories by an Alameda County, California, court to two polio victims and their parents was upheld in state district court of appeals in San Francisco. The hearing stemmed from an earlier verdict in a suit that charged that the children contracted polio after receiving shots of defective vaccine manufactured by Cutter.

The appeals court also upheld the jury's decision that Cutter had not been negligent—but at the same time affirmed its verdict that the vaccine carried an implied warranty. Cutter says it will appeal the verdict of im-

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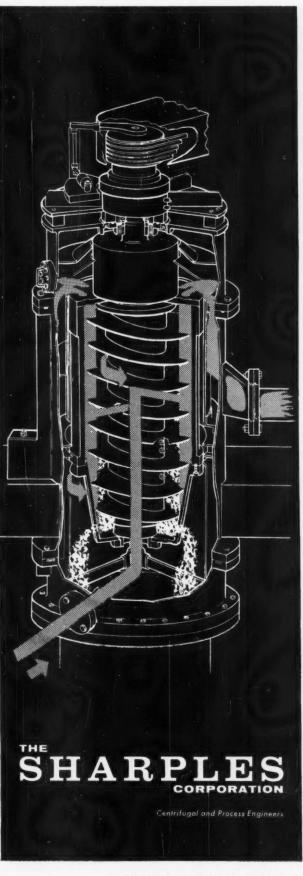


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plied warranty to the state supreme court.

Hooker Charge: The Federal Trade Commission has charged Hooker Chemical Co. with violation of the antitrust laws by its acquisition of Durez Plastics & Chemicals, Inc., in '55 and the purchase of the phenolic molding assets of Monsanto Chemical Co. in '58. FTC charges these moves allowed Hooker to become a dominant producer of phenolic plastics and various products made from the material. It says Hooker now holds about 56% of the total market for the plastic, which exceeded \$40 million in '57. Hooker is charged with violating section 7 of the Clayton Act-the so-called antimerger act. Hooker says it hasn't yet seen the official charges, but is satisfied it hasn't violated the law by the acquisitions.

LABOR

Jefferson Talks: Latest reports from Port Neches, Tex., indicate no progress in settling the strike by Local 4-228, Oil, Chemical & Atomic Workers Union, against the Jefferson Chemical Co. plant there. The strike, mainly over management operating prerogatives, has been under way since May 21. Operations have been on a partial basis since June 26, when supervisory personnel started up portions of the plant.

Vote No: Employees at U.S. Gypsum Co.'s Greenville, Miss., plant voted 139 to 127 against bargaining representation by the International Association of Machinists in a National Labor Relations Board election.

OCAW Convention: OCAW will hold its first convention in Canada at Toronto, Ont., beginning Aug. 21, '61. The Toronto session will also be the first biennial convention held by the union since it voted in '59 to change from annual to biennial conclaves. The Canadian membership has been extending invitations for several years, won out after Secy.-Treas. T. M. McCormick presented comparative convention cost figures for several U.S. and Canadian cities.

Molybdenum Climax: About 1,300 workers struck for 15 hours at the

Leadville, Colo., molybdenum mine and mill of Climax Molybdenum Co. just prior to voting to accept terms of a new two-year contract. The union, Climax Molybdenum Workers Union No. 24410, is chartered directly by the AFL-CIO, but has voted to affiliate with OCAW later this month. The new contract calls for a $10\phi/hour$ increase the first year, and a $9\phi/hour$ increase the first year. Other provisions include vacation improvements.

KEY CHANGES

George H. Lesch to chief executive officer, Colgate-Palmolive Co. (New York).

Howard S. Bunn to vice-chairman of the board, and Birny Mason, Jr., to president, Union Carbide Corp. (See p. 22).

William H. Feathers to president, Union Carbide Metals Co.; James R. Johnstone to president, Fred B. O'Mara to vice-president, production, National Carbon Co.; divisions of Union Carbide Corp. (New York).

Paul D. Scott and John L. Smart to vice-presidents, Dow Chemical of Canada, Ltd., and J. W. Everson to manager, market research department, parent company, The Dow Chemical Co. (Midland, Mich.).

Henry S. Winnicki to vice-president, Chemicals Division, Food Machinery and Chemical Corp. (San Jose, Calif.).

James W. Flynn to vice-president and director of marketing, Russell N. Clark to vice-president and technical director, Celanese Polymer Co.; Edward W. Ward to vice-president and director of marketing, Frank B. Cameron to vice-president and manager of manufacturing, Celanese Plastics Co.; divisions of Celanese Corp. of America. (New York).

J. Q. Cope to vice-president, California Chemical Co., subsidiary of Standard Oil Co. of California (San Francisco).

George R. Lawson to vice-president and general manager and board of directors, Pennsalt Chemicals of Canada, Ltd., subsidiary of Pennsalt Chemicals Corp. (Philadelphia).



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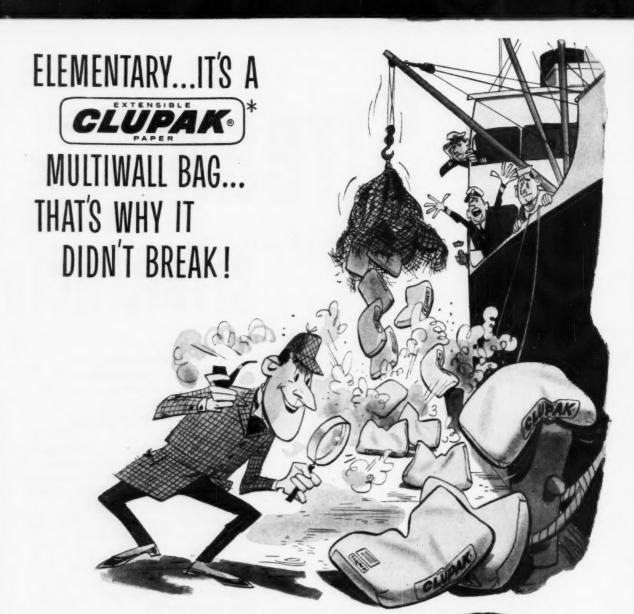
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Plant: Fieldsboro, New Jersey



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Bzura's Krentel: 'We'll get our share of the citric market.'

New Citric Sales Contender

Last week small but fast-growing Bzura Chemical Co. (Keyport, N.J.) came onstream with its novel, black-strap molasses-based citric acid plant, making it potentially the second-largest U.S. producer (capacity: over 16 million lbs./year). Bzura's long-expected move lights the fuse to what likely will become one of the hottest competitive selling battles in years between organic acid producers.

Now that it's in citric production, Bzura is shooting for '60 sales of more than \$2 million. Other products have already boosted the company's first-half sales over the \$1-million mark, and this pace is sure to mean total '60 sales will exceed '59's peak of \$1.6 million. (Sales volume in '55 reached \$500,000.) Of course, these figures reflect Bzura's total output—fumaric and succinic acids and their derivatives, fumarated rosins and other chemicals. Still to be seen is the effect of Bzura's plunge into the citric acid market.

But Bzura has made it clear it will make an all-out effort in marketing its product (samples of the first batches of commercial citric will be shown at next week's stockholders' meeting).

Heading this effort is Paul Krentel (see picture). His job: to whip together an organization and a marketing plan that will land Bzura smack in the middle of a market long-dominated by Chas. Pfizer & Co.

But the task will be tough. Pfizer, despite its still-pending tangle with the Justice Dept. on '58 charges of monopolizing the citric acid business, still has most of the U.S. market—it has five times Bzura's capacity, and can make an estimated 80-90 million lbs./year of the acid. Moreover, the citric market is now feeling steppedup sales activities by Miles Chemical Co. (Elkhart, Ind.), which has just hiked its production to 14 million lbs./year.

Sales Strategy: Here's Bzura's plan: Since more than half of all U.S.-produced citric acid is purchased by a dozen firms (mostly food and softdrink makers concentrated on the upper Eastern seaboard), Krentel is fielding a two-man direct-sales team to get this carload business.

Also, to reach the numerous scattered citric buyers across the nation, Bzura is betting on a far-flung distributor network. So far, Krentel has lined up 20 chemical distributors and three manufacturers' agents, hopes to add several more distributors soon, all of whom have exclusive territories.

Both Bzura and Miles, in challenging Pfizer's entrenched position, are counting heavily on distributor sales. But they are tackling the job differently.

Since early this year Miles has been moving its material through more than 70 distributors. Sales Manager W. J. Ferracone expects them to make 30% of Miles' '60 citric sales, probably more in '61. But industry sources say these distributors are near each other. One possible result: price-shaving to gain business.

Krentel figures he can gain more enthusiastic distributor support if each appointment is exclusive within an area. Moreover, he tells CHEMICAL WEEK that he is encouraging distributors to move small (50,000 lb.) bag and drum quantities by beefing up the margins they earn on these small lots.

Price Puzzle: Perhaps no aspect of the citric sales struggle has caught more widespread interest than that of costs and prices.

Bzura claims its process embodies several cost-cutting features (CW, Dec. 5, p. 36) that allow it to make acid more cheaply than Miles or Pfizer. This has yet to be verified by extensive operating experience, of course, and Miles has expressed doubts that Bzura will go as low on manufacturing costs as it claims.

Whatever the manufacturing costs, the selling prices are likely to get most of the attention. And Bzura's latest price sheet—supposedly representative of commercial prices for the immediate future—lists tabs virtually the same as Pfizer's and Miles'.

According to Krentel, Bzura will not go after business on a "cut-rate price" basis, as has been hinted. Naturally, if all Bzura's expected economics pan out, the company will be in a favorable competitive position



Miles' Ferracone: He's putting stress on a strong distributor network.

should prices be slashed. And in the overseas market, where current citric tabs are about $20-21\phi/lb$. (compared with $29-30\phi$ in the U.S.), Bzura may pack a potent sales weapon.

Crystal-Balling Citric: With total citric consumption slated to rise some 6-8%/year through the '60s, producers can look for steady expansion of business. But beyond that it may be some time before the full impact of the "hard sell" in citric marketing can be interpreted.

Meanwhile, Bzura is said to be expanding its fumaric acid capacity at its Fieldsboro, N.J., plant, readying more fermentation-derived chemicals for the marketplace. Coming soon: itaconic acid.

It is also setting up an international division to handle overseas business, showing it is putting its citric challenge on a worldwide basis.

Clearly, though Bzura is last to start selling, it seeks to be first in sales. Just how well it can carry out its intentions, however, depends on how Pfizer and Miles meet its challenge.

Taking the Sales Pulse

Rising sales costs, more competitive selling, clouds on the economic horizon. These are some of the topics that will be discussed at next month's National Industrial Conference Board marketing conference.

The conference—eighth of the board's annual marketing get-togethers—will be held Sept. 14-16 at New York's Waldorf-Astoria Hotel.

Generally, these meetings are standouts among the many annual marketing meetings held in the U. S.

CPI Stake: During the three days of meetings, some 16 panels will discuss current sales management problems. And of the 75-80 speakers now on NICB's agenda, over one-third are from the chemical process industries.

Among them: Keynote speaker Howard J. Morgens, president of Procter & Gamble Co.; E. J. Sullivan, Borden Chemical's executive vice-president; Clarence F. Manning, Reynolds Metals' vice-president; Robert Smith, Du Pont's Film Dept. sales director; Shea Smith, III, assistant to the president of Monsanto Chemical Co.; Don C. Millerand, B. F. Goodrich's vice-president for marketing; I. H. Munro, Allied Chemical's vice-president for marketing.

Discussion Themes: Three themes will get center stage at the conference: sales planning, sales management and marketing research. Included under the sales planning will be discussions on planning long-range growth, international marketing and, specifically, the sales outlook for '61 in each of the major industries.

In sales management discussions, the conference participants will consider how to increase salesmen's efficiency, reduce the workload on sales managers and how to improve sales organization and administration.

The marketing research discussions will center on market-testing new products, making better use of marketing research, and successful forecasting techniques.

DATA DIGEST

- Plasticizer: Data sheet lists specifications and properties of new, clear polymeric plasticizer. Typical uses: rug backings, emulsion waxes and polishes, paints and adhesives. Hercules Powder Co. (Wilmington, Del.).
- Sodium Chloride: Latest ACS monograph on sodium chloride contains 26 chapters and 752 pages on the sources, properties, production and uses of salt and brines. Reinhold Publishing Corp. (New York).
- Vinyl Coatings: Booklet describes methods of applying vinyl coatings to metal surfaces, including spraying, dipping, knife coating, reverse roll coating and laminating vinyl

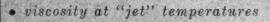
film or sheeting to metal. Also discussed: advantages and availability of prefinished vinyl-clad metal. Dept. VM, Monsanto Chemical Co. (Springfield 2, Mass.).

• Shipping Services: Booklet describes company's storage and transportation services to the chemical process industries. General American Transportation Co. (Chicago 3).

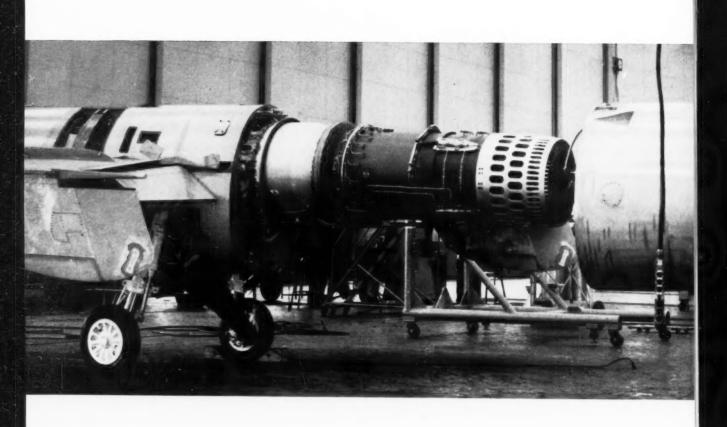
- Vinyl Ethyl Ether Resins: Booklet describes line of vinyl ethyl ether resins available in three molecularweight ranges, in hexane solution or solvent-free. Uses: pressure-sensitive adhesives, rubber modifiers, calking compounds, laminating agents and plasticizers. Union Carbide Plastics Co., division of Union Carbide Corp. (New York).
- Food-Grade Oils: Bulletin discusses the effect of the new food additive laws on the food uses of white mineral oils and petrolatums. Sonneborn Chemical and Refining Corp. (New York).
- Peroxygen Chemicals: New bulletin lists literature available on company's line of peroxygen chemicals for use in textile processing, paper and pulp processing, organic synthesis, metal treating and other uses. Becco Chemical Division, Food Machinery and Chemical Corp. (Station B, Buffalo 7, N. Y.).
- Textile Softener: Data sheet outlines properties and uses of cationic textile softener available as a fluid dispersion. Chemicals Division, Atlas Powder Co. (Wilmington, Del.).
- Bulk Resin Handling: New, 24page booklet presents case for purchasing polyethylene resins in bulk quantities, compares savings achieved in ordering rail-car quantities versus bagged loads or in large rubber containers. U. S. Industrial Chemicals Co., division of National Distillers and Chemical Corp. (New York).
- Emulsifier: New, 20-page booklet describes properties and applications of an emulsifier based on cetyl, stearyl and higher alcohols. Some uses listed: ointments, creams, lipsticks, make-up bases. Aceto Chemical Co. (40-40 Lawrence St., Flushing 54, N.Y.).
- Calcium Carbide: Brochure discusses history, manufacture and uses of calcium carbide and its derivative, acetylene. National Carbide Co., division of Air Reduction Co. Inc. (150 East 42nd St., New York 17).



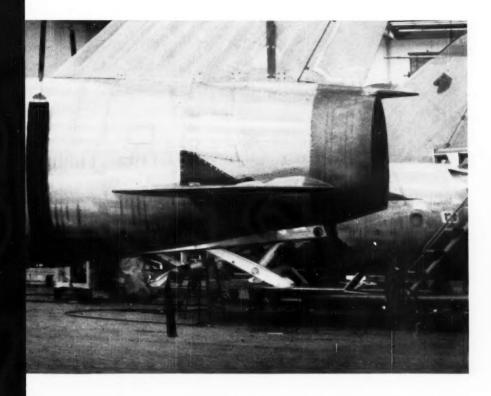




- · how bulk buying saves
- two new uses for urea-formaldehyde concentrate
- phenol production expanded



• synthetic lubricants made with Allied Chemical adipic acid maintain viscosity at "jet" temperatures



On modern jets, where temperatures may range from $-65^{\circ}\mathrm{F}$ to as high as $425^{\circ}\mathrm{F}$, low-cost synthetic lubricants made with Allied Chemical adipic acid are showing remarkably stable temperature viscosity. Used in turbine bearings and other essential parts, they do not "thin" at elevated temperatures or stiffen in cold.

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NATIONAL ANILINE DIVISION

· Solvay technical service saves customers

\$64 to \$71 per ton through bulk handling



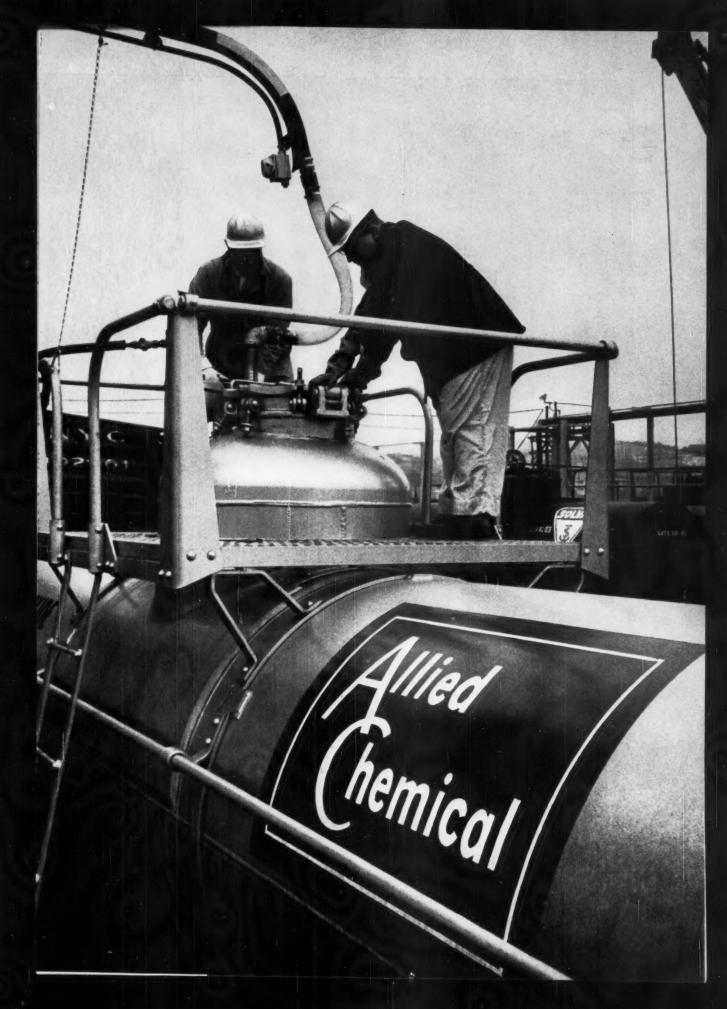
When chemical costs are static, look to more efficient handling, storage and use for savings. For example, volume users of Solvay 50% hydrogen peroxide save \$64 per ton by switching from drum to bulk buying—and additional savings of up to \$7 per ton are reported in handling. Dollars thus saved rapidly amortize the cost of new handling and storage equipment.

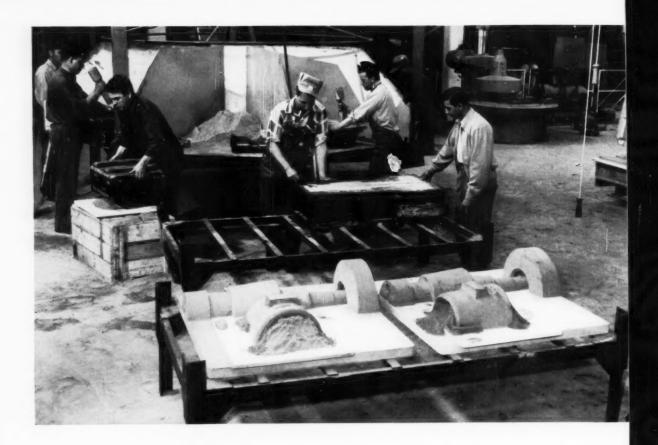
Important cost-cutting advantages realized by bulk buyers, in addition to the lower cost of the material, itself, include: elimination of the drum deposit; ease of control and measurement; less manpower required for warehousing and in-plant handling; no residue return; reduced fire hazards; less storage space; and reduced material loss.

Let Solvay's Technical Service determine if your operations warrant a switch to money-saving bulk buying—and help you plan the bulk handling installation best suited to your needs. Write or phone for a preliminary survey. This is only one of Solvay's many technical services available to you.

SOLVAY PROCESS DIVISION

It takes a lot of time for four or more men to unload and warehouse drums of hydrogen peroxide manually (above). But attaching unloading equipment to a 4000-gallon tank car for transfer of shipment to bulk storage is only a few minutes work for two men (right).





• research points the way to new uses for U. F. concentrate-85

Allied Chemical research has added two new uses to the already impressive number of applications of U. F. Concentrate-85—a high solids content product of urea and formaldehyde.

In the wood products field, U. F. Concentrate-85 is now being used for "in situ" resin binding of plywood and particle board. Basically, veneer is spread, (particle board chips are sprayed), with an unreacted U. F. Concentrate-85—urea binder mixture. It is then placed in presses under proper temperature and pressure, and finished panels are produced.

U. F. Concentrate-85 also offers a low-cost route for preparation of green sand for core molds, and is presently used in large foundry operations. Mixed with urea and a small quantity of additive, cured cores have an excellent surface, good burnout properties and adequate tensile strength.

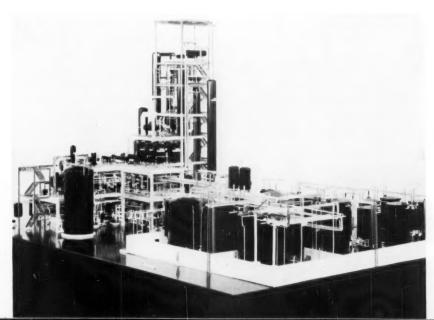


■ NITROGEN DIVISION

Allied Chemical expands phenol production as basic chemical demonstrates potential in new applications

Recent developments indicate that the potentialities of phenol—now widely used in the manufacture of dyestuffs, medicinals, insecticides, phenolic resins, caprolactam monomer for fibers and molding compounds, and many other materials—are still far from being fully realized. Looking ahead to an ever-increasing demand for this basic chemical, Plastics and Coal Chemicals Division has recently expanded its production facilities at Philadelphia, Pa. Only Plastics and Coal Chemicals Division can supply every grade of phenol, both synthetic and natural—with fast delivery by tank car or trucks from Philadelphia or Toledo assured. Allied synthetic phenol is made to specifications more exacting than those required for the U. S. P. grade; and in liquid water solutions in strengths of 90-92 and 82-84 per cent. Plastics and Coal Chemicals Division invites your inquiries.

PLASTICS AND COAL CHEMICALS DIVISION



Scale model of phenol expansion at Philadelphia, Pa.

· basic to America's progress



For more information, write Allied Chemical Corporation, Dept. 80-CB 61 Broadway, New York 6, New York.

In Canada: Allied Chemical Canada, Ltd., 1450 City Councillors Street, Montreal

· principal products for industry

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GENERAL CHEMICAL DIVISION—sulfuric and other commercial acids, alums, phosphates, fluorine and sodium compounds; BAKER & ADAMSON reagents and fine chemicals; GENETRON refrigerants and aerosol propellants; agricultural insecticides, fungicides, weed killers and specialties.

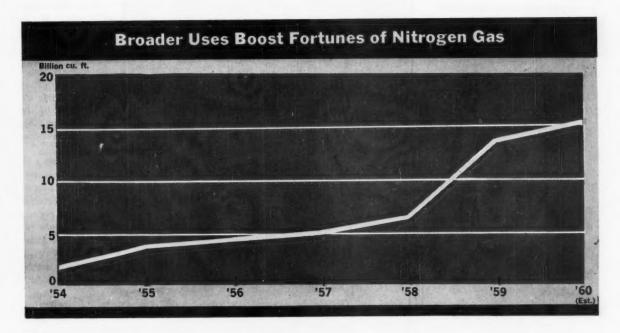
INTERNATIONAL DIVISION—selling Allied Chemical products for export markets.

NATIONAL ANILINE DIVISION—NA-TIONAL dyes and certified colors; HARMON COLORS (organic pigments); NACCONOL detergents, organic chemicals and intermediates, pharmaceutical chemicals; NACCONATE diisocyanates for urethane products; CAPROLAN polyamide fiber. NITROGEN DIVISION—ARCADIAN fertilizers, nitrogen solutions; PROCADIAN feed mixtures, ammonia, urea, ethylene oxide, ethylene and polyethylene glycol, ethanolamines.

PLASTICS AND COAL CHEMICALS DIVI-SION—coal-tar chemicals; PLASKON molding compounds, industrial and coating resins; industrial tar products, including creosote oils, pitches, coatings, pipeline enamels.

SEMET-SOLVAY DIVISION—A-C polyethylenes; coke and by-products; WIL-PUTTE by-product coke ovens and coal chemicals plants and engineering services.

SOLVAY PROCESS DIVISION—soda ash, caustic soda, potassium carbonate, caustic potash, chlorine, chloromethanes and benzenes, hydrogen peroxide; calcium, aluminum, ammonium chlorides; cleaning compounds; vinyl chloride; MUTUAL chromates.



New Uses Nudge Nitrogen's Growth Curve

Nitrogen, once considered a valueless by-product of many airseparation plants, is assuming new importance. This year, production is expected to increase a solid 10% over '59's output of 13.7 billion cu.ft., may grow at an even-faster rate during the next five years. Reason: wider use in steel operations, space-age work, electronics, chemicals, and the new field of cryogenics.

Interest in nitrogen has spurred industrial gas producers to include nitrogen recovery units in many of the new air-separation plants built during the past 18 months. Newest is Air Products' \$6-million plant at Creighton, Pa., which was officially dedicated last week. It has a capacity of 200 tons/day of liquid oxygen-nitrogen. (13.8 cu.ft./lb. of nitrogen).

Earlier, five additional liquid oxygen-nitrogen plants were started up by the other three nationwide industrial gas producers: Linde, division of Union Carbide Corp.; Air Reduction Co., National Cylinder Gas Division of Chemetron.

Largest industrial gas producer, Linde, recently brought in a new liquid oxygen-nitrogen plant at Gary, Ind. And the company already has plans to increase its total U.S. liquid oxygen-nitrogen capacity by 450 tons/day (this does not include capacity of Linde's other oxygen-only plants). The expansion will be accomplished by the addition of two new plants, now under construction, at Huntsville, Ala., and Neosho, Miss., plus expansion of its Fontana, Calif., plant. The Huntsville unit is expected to be in operation later this year.

Air Reduction put three 30-tons/day liquid oxygen-nitrogen units onstream earlier this year: a West Coast unit (at Richmond, Calif.), one at Fairfield, Ala., and another at Baton Rouge, La. Meanwhile, the company has broken ground for its first liquid oxygen-nitrogen unit in Florida. It's located at Tampa. Capacity will also be 30 tons/day of liquid oxygennitrogen.

National Cylinder Gas put its liquid oxygen-nitrogen plant at Dallas, Tex., onstream during closing days of '59.

Finding a Market: Last year nitrogen output departed from its steady upward trend, jumped 105% over '58 levels. However, most of this increase came from a previously unreported plant, is thought by many observers to be nitrogen going into ammonia manufacture. If so, this would mean the '59 data is inflated. Reason: although large quantities of nitrogen are used in fertilizer production, this nitrogen is not included in the government classification of "nitrogen

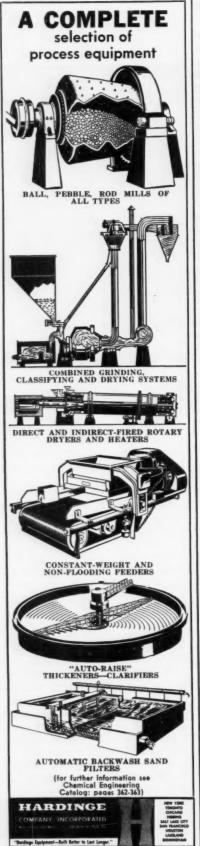
In any event, nitrogen gas is now carving out its own markets, and during the next few years its importance as a first line commodity is expected to grow rapidly.

Steel appears to be the biggest potential market for nitrogen. Steel companies now consume large quantities of oxygen, the main product of air-separation units.

One example of the potential growth for nitrogen in this area: U.S. Steel's Gary plant uses about 350,-000 cu.ft./hour of nitrogen in its hydrogen-nitrogen (HNX) annealing process for hardening steel. Linde's Gary plant, which recently began production, supplies both oxygen and nitrogen to the steel plant.

Linde also recently began supplying gaseous nitrogen via pipeline from its Pittsburg, Calif., plant to Columbia-Geneva Steel's nearby unit for its HNX process. Linde's Pittsburg plant was completed Oct. '59, has a capacity of about 235 million cu.ft./month of nitrogen and oxygen.

The HNX annealing operation is



expected to contribute strongly to the future growth of nitrogen. And several other uses of nitrogen in steelmaking, such as in stainless steel production, also promise to increase demand.

Space-Age Take-Off: The missiles and rockets industry is a big consumer of nitrogen, both in the pretesting of engine parts and for low-temperature environmental testing of components used in these vehicles. It's also used to purge lines and containers for storage or transportation of the highly reactive liquid oxygen. How much nitrogen is actually consumed in these applications is, of course, a military secret, but industry agrees this outlet accounts for a large share of nitrogen consumption.

Most of the space work is carried out by the U.S. government, which had contracted with Air Products to build and operate 15 liquid oxygennitrogen plants at five different locations. Each unit now has an estimated capacity of 7.5 tons/day of liquid nitrogen, plus 75 tons/day of oxygen. Their total potential nitrogen capacity: about 113 tons/day.

Another use of liquid nitrogen is in the low-temperature environmental testing conducted by private industry. Many companies that develop equipment used in the space field must subject their products to the low temperatures and pressures that might be encountered in outer space. For this reason they've set up their own testing facilities.

Electrical Impulse: Another potentially large market for nitrogen is the electronics field, where the use of the gas is still in infancy. Currently, the largest use is in processing of electronic components. In many electronics processes today it's important to have an extremely pure environment when manufacturing components. Therefore, in certain processing steps the atmosphere gas is passed through a liquid nitrogen cold trap to eliminate moisture and other gaseous impurities. In the alloving of aluminum and silicon for the manufacture of semiconductor diodes and transistors, this trap is necessary, because the slightest trace of oxygen, carbon dioxide or water vapor, even in parts per million, could ruin the electrical properties of the finished component. The cold trap is also important in the growing of single-crystal silicon crystals. Again, the impurities of oxygen and carbon dioxide will alter the electrical properties of the crystal.

The exact size of the nitrogen market in the electronics industry is not known. But this outlet is significant and growing. In New England, for example, demand for nitrogen by the electronics industry is so great that oxygen is considered the by-product in some cases.

Some indication of the quantity of nitrogen used in a single plant was given by E. M. Baldwin, vice-president of Rheem Semi-Conductor Corp., at the International Acetylene Assn. meeting in San Francisco recently. Baldwin estimated his company uses about 1 million cu.ft./week of nitrogen in semiconductor manufacture when the plant is operating at peak production.

A yet-to-be-determined market for nitrogen is in the field of cryogenic electronics. Although helium gets the nod in most applications because it provides a lower temperature, liquid nitrogen is expected to be used as a cooling jacket to prevent heat loss.

Chemical Uses Growing: In the chemical industry, the inertness of nitrogen makes it an effective blanketing material in many processes where air could be detrimental. It's also used to purge lines and containers before filling with a product.

Isocyanate production offers one example of an important use of nitrogen. Late last year a Linde on-site plant that could produce 25 tons of medium-purity oxygen and 25 tons/day of high-purity nitrogen went onstream at Mobay Chemical Co.'s New Martinsville, W. Va., isocyanate facilities. Oxygen is used in the manufacture of isocyanates; the nitrogen is used as a blanketing material for handling and storage. Even when the material is transported in tank cars or other containers a covering of nitrogen is used.

Other smaller uses of nitrogen that hold promise of growth over the next few years include food processing and cryobiology.

Nitrogen applications in food processing have attained reasonable success mostly as a blanketing material. Some sources still see this as a potentially large market.

The field of cryobiology is still



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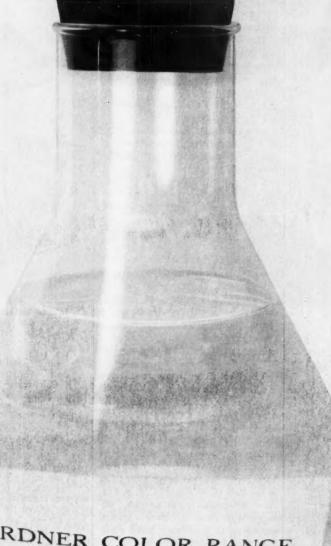
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PROPERTY DATA

Physical Properties Compound	H.A. para Methyoxy Phenol	D.M.B. para Dimethoxy Benzene
Chemical Formula Molecular Weight Boiling Point °C	C ₆ H ₄ (OCH ₃) ₂ 138.16	
760 mm. Hg		213°
100 mm. Hg		140° 123°
10 mm. Hg Melting Point °C	126°	89° 56°
Density gms./ml. (65° Solubility		1.0293
(25°C in gms./100 gms. solvent)		
Water		Insoluble
Benzene		233.0
Ethyl Acetate	245.0	150.0
Alcohol	Tan to white	33.3 White
Odor	Characteristic	Sweet Clover



MARKETS

young but could develop into a sizable market. Two projects now receiving attention are the preservation of blood and bull semen by low-temperature processing techniques based on nitrogen.

Distribution Setup: An interesting sidelight to the growth of nitrogenoxygen separation plants is an intricate setup the trade calls "back-up." Since a continuous supply of nitrogen, as well as other gases, is essential to many operations, producers have strategically located their plants so that if one unit should be out of action, supplies could be hauled in from another plant.

Storage and distribution installations at the local level are also included in this setup, to handle the needs of smaller users, which would not require a full-size plant.

In the past two years, industrial gas producers have invested millions of dollars in plants for both liquid oxygen and nitrogen. And, although greatest demand will still be for oxygen, nitrogen will be a fast-growing second.

Ammonia in the Air

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The West Coast ammonia situation is still up in the air this week. Despite attempts by Collier Carbon (CW Market Newsletter, July 30), Hercules Powder and Valley Nitrogen to post higher prices, ammonia is still selling at \$66/ton.

Since '58, West Coast tabs have been about \$22/ton lower than those in the East (CW, Jan. 31, '59, p. 82). Now ammonia manufacturers, unhappy with these unprofitable quotes, are trying to establish a more equitable price level.

Collier's move, although not the first, was the boldest. On Oct. 1, its posted price for ammonia will be \$92/ton. Earlier this year Hercules proposed a three-pronged attack on the problem, was soon followed by Valley Nitrogen, a farmer co-op west of the Rockies. Under the Hercules plan, the ammonia price would be increased \$3/ton starting Aug. 1, with additional increases of \$3/ton Oct. 1 and Jan. 1, '61, thus putting the opening quotes for next year at \$75/ton. Reports indicate, however, that the Aug. 1 price of \$69/ton is not sticking-other producers are offering ammonia at \$66/ton. Of

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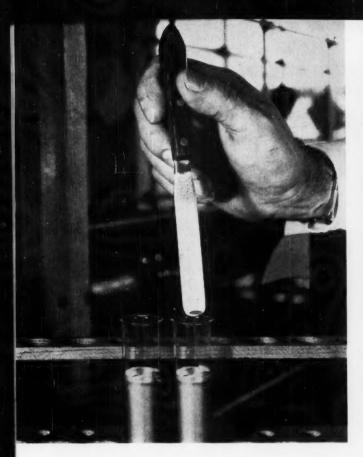
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NEVILLE COUMARONE-INDENE RESIN was mixed with aluminum pigment and petroleum spirits in this test. The picture was taken exactly three minutes after the spatula was removed from the test tube. Leafing has risen to 78% of the immersed surface.

COMPETITIVE RESIN used in this otherwise identical test formula was a well-known hydrocarbon petroleum type. Test procedure was exactly the same, and after three minutes complete leafing had occurred on only 46% of the area of immersion.

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To arrive at the evidence shown above, our technicians followed test procedures as outlined under ASTM 480-59T for the leafing properties of aluminum pigments, except that we used two resins while retaining the same pigment. We believe the leafing advantage gained through the use of Neville Coumarone-Indene Resin is completely self-evident in the left-hand picture.

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MARKETS

course, Hercules and Valley must meet the prices of competitors.

Observers also predict the same fate for Collier's \$92/ton tabs, feel that other producers will not follow, forcing Collier to meet competitive tabs of \$66/ton. But, the move could have a psychological effect on the market, rouse an otherwise stymied industry to take some action to up their quotes.

Major factor in the West Coast market is Shell, since it is the largest ammonia producer there. And until it decides to increase tabs most posted prices by other producers will be almost meaningless. Shell is in no hurry, however, since contract terms give it until mid-September to notify customers of higher prices.

And despite the confusion now, consensus is that prices will be increased soon. Every ammonia manufacturer on the West Coast is unhappy about the current price schedules. The low tabs mean low profit margins, low return on large investments. One observer points out, "We're selling very little extra ammonia because of bargain prices."

But any increase probably would not be as large as Collier's, since this would once again tempt co-ops into the field. It's very likely that the Hercules approach, with Shell going along, may be the way industry can lift its price. By boosting tabs stepwise, producers would have time to feel out the market, without taking a chance on being stranded. Clearly, success of new prices depend on what Shell does.

Ammonia More than Enough: The big problem on the West Coast is excess capacity, now estimated at 165,000 tons. Estimated potential supply of the area (which includes California, Washington, Oregon, Arizona, Nevada, Utah, Idaho, Montana, Hawaii): synthetic ammonia 628,000 tons/year to which can be added 16,000 tons/year from by-products, 2,000 from natural sources and 20,000 tons/year from Midwest producers. Imports are about 120,000 tons. Total supply: 786,000 tons. Demand, however, is only around 620,000 tons.

For now, West Coast ammonia producers can only wait and hope. If Shell decides to move, the rest of the industry will gladly follow. Otherwise consumers will still be paying \$66/ton next quarter.

Performance makes the world of difference



Fig. 2453SG—Large Stainless Steel O. S. & Y. Gate Valve for 150 W.P. <u>Fully guided</u> solid wedge disc. Also available with interchangeable split wedge disc — Fig. 2453DG.

Fig. 2433SS — Large Stainless Steel Swing Check Valve for 150 W.P. Bolted flanged cap. Integral seat. Teflon disc and renewable seat ring are available on special order and at extra price. Fig. 2309—Large Flush Bottom Tank Valve for 150 W.P. Designed for fast draining. Disc opens into tank. Also available with disc opening into valve — Fig. 2310.

Fig. 2107 — Small Stainless Steel "Y" Valve for 150 W.P. Flanged ends, but can be supplied with screwed or socket welding ends. Dimensions conform to latest standards.

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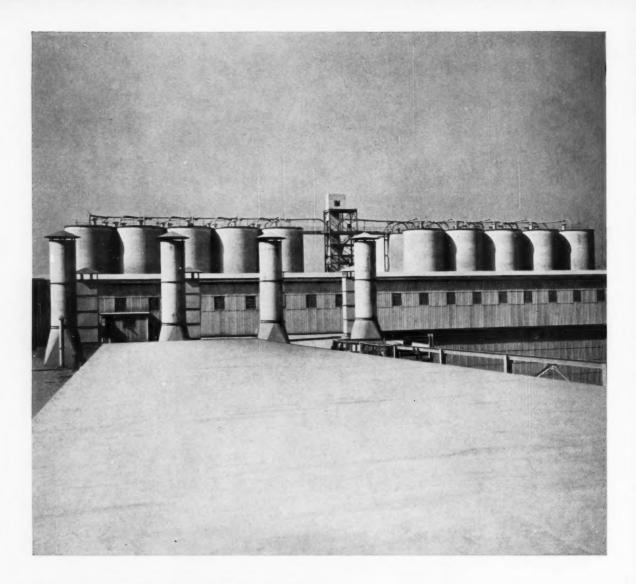
others to handle the acids, alkalies, organic solvents, and gases encountered in the Chemical and Process Industries.

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Technology

Newsletter

CHEMICAL WEEK August 6, 1960 A new Ohio court ruling appears to bar handling of patent applications for clients by independent research organizations where such activities constitute "unauthorized practice of law." Battelle Memorial Insitute (Coumbus, O.) was held to be engaged in unauthorized practice of the law and was enjoined from handling patents for research sponsors in a ruling by Franklin County Common Pleas Judge George Marshall at Columbus. Under contracts with its sponsors, Battelle has processed patents for clients where an invention has been involved, although the sponsor has had the option of using its own counsel. Absence of "proper patents for clients where an invention has been involved, although the loyalty to the client) was the basis for the judge's decision.

Battelle tells CHEMICAL WEEK that its patent-handling activity proscribed by the court is small and that "the opinion does not jeopardize a sponsor's rights to his patentable developments but simply affects the mechanics of securing those rights." But legal experts believe the court decision may eventually affect many research institutes and universities that cooperate with industrial and government sponsors in transferring title to patentable developments.

Production time required to make strong, dense graphite is reduced from a conventional 90 days to less than two hours with a synthetic binder developed by Armour Research Foundation of Illinois Institute of Technology. Although Armour won't disclose the composition of the new binder, it does say the material eliminates the baking stage required in present commercial graphite-producting methods. Graphite made with the new binder has been tested up to temperatures of 6000 F by the Atomic Energy Commission. Expected uses are in pyrolitic graphite, which can resist high temperatures, repel surface heat on missiles by radiation instead of ablation. AEC hopes to use the new graphite in high temperature nuclear reactors.

A "breakthrough" in the reduction of beryllium ores is the claim of two companies scrambling for claims in Utah's Topaz Mountain area (CW, June 25, p. 103). Beryllium Resources, Inc. (Los Angeles) and Brush Beryllium Co. (Cleveland) jointly disclosed discovery of a way to use acids in recovering beryllium oxide from the Topaz Mountain ores. Although details of the process were not reported, the product is described as beryllium hydroxide similar in quality to that currently being produced by Brush Beryllium from African ores.

Development of a new dry chemical for fighting jet fuel, petroleum and chemical fires is being pushed by fire-extinguishing agent suppliers. The chemical: potassium bicarbonate, which has been treated to prevent caking, is said to be superior to presently used sodium bicarbonate.

Technology

Newsletter

(Continued)

Explosive forming of Polaris rocket end closures is under way at Aerojet-General Corp.'s Ordnance Division (Chino Hills, Calif.). Production use of the much-researched technique (CW, Aug. 8, '59, p. 75) utilizes a liquid explosive called Aerex to force flat metal blanks into a dome-shaped die. Aerojet has a patent pending on Aerex, won't say anything about its composition other than that it's a "sensitized nitroparaffin."

A new, more durable wood-pulp paper has been developed under a grant to the Virginia State Library (Richmond) by the Council on Library Resources, Inc. The paper has a theoretical life of at least 300 years, compared with less than 50 years for most would-pulp paper now in use. And it is said to be competitive in cost, based on commercial runs made by Standard Paper Mfg. Co. (Richmond).

Equal parts of wood pulp made by the sulfate, sulfite, and sodapulping processes are used in the formula. This is filled with 10% clay and 10% calcium carbonate added in the beater. Machine sizing is a mixture of Hercules Powder Co.'s Aquapel (alkyl ketene dimer resin) and Kymene 557 (a polymer type of wet strength resin).

A new firm—Tyco, Inc.—that offers research and management services to selected small companies has been formed in Boston. Headed by Arthur Tyler, former assistant director of research at Eastman Kodak and a cofounder of Itek Corp., the new company will concentrate its initial efforts in the areas of solid-state materials and devices, energy conversion, data processing and information technology.

Tyco will operate by buying up or investing in small companies that can't support an effective effort in areas of research, manufacturing and marketing. The new firm says it is backed by private funds, is not operating under the Small Business Investment Act.

A dependable measles vaccine is coming closer to reality, according to reports from Harvard Medical School doctors John Enders and Samuel Katz. Although further clinical trials are called for, the vaccine has shown favorable results in 303 children tested in Boston, New Haven, New York, Cleveland and Denver.

Dr. Enders discovered that in '57 one particular strain of measles virus (the Edmonston strain) could be propagated in chick embryos. The following year, Dr. Katz worked out a procedure for producing a vaccine almost wholly free of extraneous protein. Successful antibody buildup in tests with monkeys, with no evidence of rash or illness, led the doctors to initiate the clinical trials.

A new food-packaging film made from polystyrene foam is offered by Monsanto Chemical Co.'s Plastics Division (Springfield, Mass.). It is competitive in price with paper, costs about \$4.00 to \$7.00 per 1,000 sq. ft., features resistance to water and grease, receptivity to embossing and printing. Called Santofome, it has been accepted by FDA.

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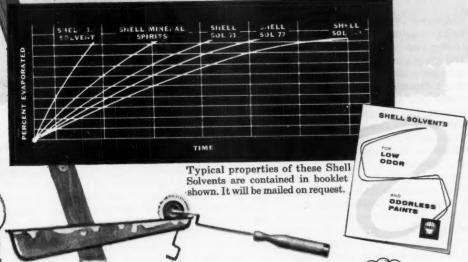
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Rising cost of hiring and maintaining researchers is spurring search for increased productivity.



Productivity Prescription: Bolster

Research directors are currently facing some hard truths. It is now costing them some \$30,000-40,000/year to add a staffer; the capital investment per researcher has risen in less than a decade from about \$20,000 to as high as \$50,000. But in spite of the need to get full productivity from such expensive "equipment," there's surprising lack of system in winnowing out-or better utilizing-the marginal staffer.

This shows up strongly in a new, national survey by CHEMICAL WEEK. If there is one characteristic of CPI researcher evaluation plans, it's the informality of the program. The CW check turned up a wide range in method and frequency of evaluation -few were as formal as the six-point check list (p. 67) devised by Arnold Kaulakis, acting general manager of engineering at Esso Research and Engineering Co. (Linden, N.J.), formerly director of the firm's Process Research Division and director of employee relations. The Kaulakis plan, by its formality, gives a good standard by which to compare plans of other companies.

Kaulakis feels that his program, aside from simplifying the job of evaluating the researcher and making evaluation more scientific, pinpoints the weakness of a staffer in a way that permits the research director to take remedial action. This might be done through job assignment or putting him to work with others who can help balance out his skills. Strengthening staffers is vital, Kaulakis says, to help relieve the shortage of top research talent.

"There's too much 'sink or swim' philosophy in personnel evaluation," Kaulakis believes. "Many research managers don't think enough about it," he says, and consequently don't use their staffs to best advantage. Yet the profit in upgrading is substantial.

"If the bottom 90% of the staff can be upgraded just 5%, the output of the research organization can go up tremendously."

Determining Traits: The CW survey strongly points up the surprising difference in opinion about what is most important in sizing up a researcher. The man's personal traits and experience frequently count heavily in the appraisal.

"I have come to believe that adjustment to reality is a most important trait, and one that few researchers have," claims Carl Pacifico, vice-president of American Alcolac Corp. (Baltimore, Md.). Most researchers want to do the impossible in one fell swoop-laudable but impractical, he

"We take care of a lot of evaluation problems at the time a new man is employed."

All else being equal, he says, "we'll take the man who has faced some

The ideal researcher can . . .

Translate or unscramble the statement of the problem into clear, concise research questions.

Hypothesize (postulate tentative answers) to develop a working basis for intelligent action.

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Organize and interpret the results in a form that is useful for subsequent application work.

Apply the results to answer the specific problem.

Your Researchers' Strengths

rough personal problems. Meeting a real crisis—economic, sociological, or whatnot—and coming through without being crushed by the experience, is an unpleasant but generally effective way to develop a realistic attitude. Such a man takes his problems one at a time. Further, he will more readily take soundly calculated risks; for, having met with major reverses, he is not going to give undue weight to the minor rebuff he may face if his gamble does not pay off."

Similar views are held by F. H. Roberts, research vice-president of Union Carbide Plastics Co., division of Union Carbide Corp. Says Roberts, "We evaluate research people by no rigid rule book, but by careful individual assessment of such factors as their interest in their work, their astuteness in planning steps toward solutions, their ability to recognize research by-products turned up in their work, and their tenacity in fac-

ing up to the inevitable lack of productive results in many projects."

Ability of a researcher to persuade a firm to take on a given research project is particularly important to Ray Schultz, vice-president, research and development, of Copolymer Rubber and Chemical Co. (Baton Rouge, La.).

Says Schultz, "Our firm looks for judgment in a research man. If a man feels he is on a project that is no good, we expect him to object to it and ask to get off it." The firm's supervisors evaluate staffers during the year, but not at the same time evaluation is made for salary recommendations.

Personnel Audits: Formal evaluation of staffers is favored by Standard Oil Co. of California's California Research Corp. (San Francisco) and by the General Electric Research Laboratory (Schenectady, N. Y.). Knowledge of work, planning and organizing

ability, analytical ability, judgment, initiative, and the like, are given consideration in Cal Research's appraisal sheet, which also provides space for remarks.

At Cal Research, supervisors' remarks serve as a guide to other management men reviewing the employee, also help in discussing the employee's performance with him. Supervisors rate over-all performance as unsatisfactory, fair, good, very good, or excellent. Cal Research President Arthur Lyman says recent opinion polls in the company show that employees endorse the appraisal program and that most of them welcome the opportunity to discuss their performance with their supervisor.

GE's plan is similar. A four-page leaflet provides for information about the rater, the employee, a summary of the rating, specific suggestions for improving the employee's performance, the rater's comments on the



Esso Research's Kaulakis: No place for 'sink or swim' philosophy.

counseling interview, and space for the rating itself. Each item in the rating (e.g., decision making) is rated marginal, acceptable, satisfactory, or outstanding.

Time Will Tell: The informality of many systems is also reflected in the time companies allow for judging an employee's worth. Smaller companies are likely to give shorter shrift to marginal staffers.

"It's best to spot deadwood quickly," claims Aaron Rose, director of the Texas Experiment Station (College Station, Tex.). "Some famous researchers have been putterers, but that's unusual in industry." He does not, however, set arbitrary time limits.

Richard Kithil, vice-president of Carwin Co. (North Haven, Conn.), agrees. And his comment explains in some degree why there is such a wide difference in evaluation programs. "We have no time or desire for the paraphernalia of psychological, intelligence and other tests—nor any need for them—for it is an inherent advantage of a small company that no one is lost within a group. We know every individual as an individual. There is no danger of his accomplishments—or his failures—being hidden."

Arbitrary time periods are fre-

quently used to gauge researchers. Marshall Welch, vice-president of research and development of Petro-Tex Chemical (Houston, Tex.), estimates it takes at least three years to evaluate the holder of a B.S. degree, and two or three projects to tell if a Ph.D. is good or not.

But Welch says that he won't release a staffer, provided he has other attributes, prefers to see him go into operations or sales. Like Kithil, Welch doesn't like psychological tests, thinks it's difficult to correlate test results with research achievements. "Sometimes you can change a man's supervisor and get better research results" —a point that bears out Kaulakis' thesis.

Jefferson Chemical Co.'s (Austin, Tex.) director of research and development, W. J. Peppel, waits two or three years before drawing conclusions about a researcher's value. "If he doesn't seem promising, we look around in our organization for other work for him, unless he sees the light himself and leaves our company. We may consider some type of testing procedure in the future."

No Hasty Judgment: It's possible to determine a man's competence in six to eight months, according to Armour Research Foundation's (Chicago) assistant director, Christopher Barthel.

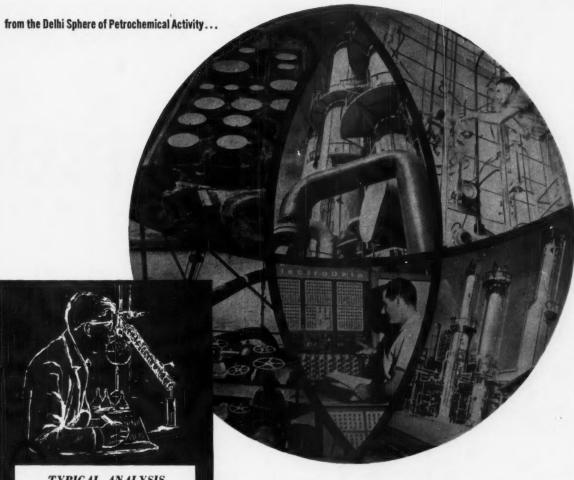
But Barthel acknowledges that the chance of marginal talent showing up in the research department is slim, since ARF has a thorough screening program for prospective employees, seldom hires recent college graduates or even B.S. degree holders, prefers people with both higher education and previous job experience.

Rather than simply firing a man who is not proving successful in one department, a study is made of his record and past experience and reassignment to another department is considered.

Agreeing that arbitrary time limits aren't important, Dewey and Almy Chemical Division (Cambridge, Mass.) of W. R. Grace & Co. uses no formal, periodical progress reports on designated dates. But target dates are set for projects, and it's considered highly important for individuals to meet this schedule. Group leaders are expected to evaluate each chemist; department managers then rule on an individual's fitness.

Once a Year: However, large chemical companies may favor annual reviews. Typically, the appraisal is prepared by the individual's supervisor and is reviewed by the next higher supervisor to insure greater objectivity in the evaluation. Performance factors considered include job responsibilities, creativity and certain personal qualities relevant to satisfactory job performance. States one major firm, "In addition to performance of his day-to-day work, the appraisal also reflects the chemist's participation in activities such as technical associations. Following the appraisal, the researcher is interviewed and a program of development is mutually agreed upon."

Time for Decision: It's almost axiomatic that management must know the talents and capacities of researchers before it can use them most effectively. Still, some research directors interviewed by CHEMICAL WEEK believe development of the art of evaluation has unaccountably been neglected. Considering that the national bill for research has risen to about 2.5% (or a current estimated \$12 billion) of the gross national product, from less than \$200 million in '36, it's a neglect that may soon be too expensive to ignore.



TYPICAL ANALYSIS

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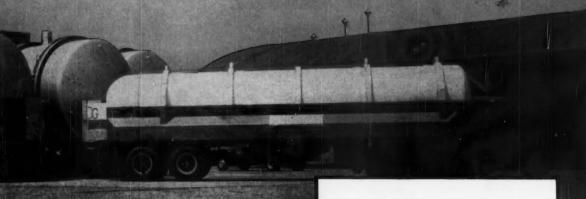
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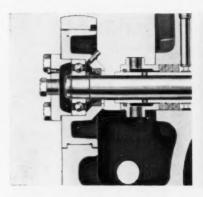
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PUMPAGE

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Circulating crude phthalic anhydride

One company does it with two Goulds Model 3171's. Each delivers forty gallons a minute of this sluggish solid (sp. gr. 1.2) from a depth of 11 ft. at temperatures from 300 to 525 F. How? The discharge pipe, which extends from

pump through pit cover, wears a steam jacket. Temperature stays up—phthalic anhydride stays fluid. The long pipe has a 3" expansion joint. Additional steam-jacketed pumps of other and varying lengths give flexibility to the installation. For details on how Goulds Model 3171's can help you move uncooperative solids, write for Bulletin 726.2.



Nuclear nomad of the seven seas

N. S. Savannah, first atomic-powered merchantman, will call at the seaports of the world as a symbol of the peaceful use of nuclear power. The 21,800-ton ship has a practically foolproof power plant. Its pressurized-water nuclear reactor uses uranium oxide fuel. Goulds Model 3655 (close-coupled centrifugal) pumps the radioactive waste water on both bilge

and ballast service. The Model 3655 is available in 23 sizes with capacities to 2000 gpm, heads to 400 ft. Pump and motor are a single, compact unit, easy to install and ready to run. Standardization of parts holds down inventories. For full details, including specifications, construction information and performance charts, write for Bulletin 710.1.



NEW "king-size" vertical... capacities to 3180 gpm

Here are all the details on Goulds newest heavy-duty centrifugal sump and process pump—the "L" size Model 3171. Unit available in 316 stainless and other special alloys. Specifications, sectional views, construction materials, performance curves, dimensions—all are clearly given in Bulletin 726.2. For your copy, write Goulds Pumps, Inc., Dept. CW-80, Seneca Falls, N. Y.

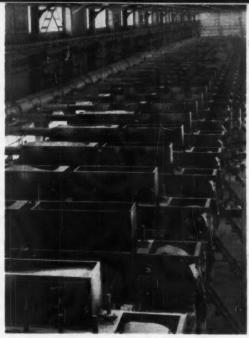




PUMPS

NEW SIC REFRACTORY OFFERS ALUMINUM MAKERS . . .

- 1-25% lower cost than that of conventional nitride-bonded silicon carbide on trial for cell sidewalls.
- 2—increased cell capacity by cutting sidewall thickness to $1\frac{1}{2}$ in. from 8-12 in. for present carbon walls.
- 3-eventual cell redesign that may cut power usage by 15 %.



Aluminum cells stand ready for changes.

Cost Bonus Backs Refractory's Opening Bid

Last week, Norton Co. (Worcester, Mass.) unveiled a new refractory material that promises to equal the temperature resistance, corrosion resistance and electrical properties of conventional nitride-bonded silicon carbide at less cost. Already on trial in aluminum reduction cells (pots), it could spur major cell-design changes that will slash potline operating costs.

The material's resistance to oxidation, abrasion and thermal shock, its stability in acid and its high thermal conductivity are responsible for Norton's prediction of wide application in process equipment construction. Potential uses: in melting and alloying equipment for nonferrous metals (e.g., zinc and magnesium); in transfer lines for molten metals and hot chemicals; in kilns, incinerators and packaged boilers.

Called Crystolon 63, the refractory is described by its inventor, Norton researcher Malcolm Washburn, as a "complex nitride-bonded silicon carbide." Because a patent application has just been filed, Washburn won't tell how it differs from conventional nitride-bonded silicon carbide, which, he says, is bonded "in part . . . through a sort of polymerized network of silicon nitride." But the new refractory will cost at least 25% less than conventional nitride-bonded silicon carbide. This economy probably

stems from shorter kiln firing time; refractories often spend up to a week in the kiln, which adds considerably to production time and cost.

A conventional 9-in. "straight" brick costs about \$4.12 when bought in quantity; the new brick will probably cost no more than \$3.09, according to Norton. And, the new product will cost about 30-50% more than oxide-bonded silicon carbide, a clayor glass-bonded product frequently called "silicate-bonded."

For Better Pots: Oxide-bonded silicon carbide will withstand the corrosive attack of molten cryolite in an aluminum cell for only a few days. In the hope of gaining a competitive edge, Norton aimed its year-and-one-half research program at a product that approaches the oxide-bonded in cost, matches nitride's service.

The Carborundum Co. (Niagara Falls, N.Y.), Norton's major siliconcarbide competitor, won't discuss new developments in the nitride-bonded area. However, it has been offering the conventional nitride-bonded product for a number of years, and at least five aluminum companies have been experimenting with nitride-bonded silicon carbide to improve cell operations.

Present cells use 8- to 13-in. thick carbon linings (usually formed from a hot ramming mixture of pulverized coke, tar and pitch, although some cells have carbon-block linings). Bob Love, Norton Refractories Division product engineer, points out that the new refractory's compatibility with the chemical environment of the cell permits sidewalls as thin as 1½ in. (Carborundum has previously talked of 3½- to 4½-in. wall thickness with conventional nitride-bonded silicon carbide.)

Thinner wall linings increase the cell cavity of existing cells, enable larger anodes to be used and increase the cell capacity. The high thermal conductivity of silicon carbide drains off excess heat, permits higher amperages without overheating the cell. It also increases the over-all efficiency of the cell by smoothing out temperature fluctuations. (Thermal stability is also improved by the increase in mass of metal and cryolite in the cell.)

Silicon carbide's relatively high electric conductivity, compared with carbon's, cuts down current losses. And, because the refractory quickly loses heat, a frozen layer of cryolite forms on the sidewalls to protect them, increase sidewall life.

Just how well these advantages will prove out in practice remains to be seen. Love says results so far "have been very encouraging." But it takes about three years to complete potline tests. According to Love, Norton's new refractory "has been in the hands

of the aluminum industry for about nine months." Carborundum has had conventional nitride-bonded silicon carbide in plant test somewhat longer.

A point to be settled: how Norton's "complex" nitride bond will affect the performance of silicon nitride, the key to silicon carbide's life in molten cryolite. (In addition to oxide-bonded silicon carbide, pure silicon carbide has been tried in cryolite and was damaged by the latter.) But if the complex nitride bond holds up well, it may be a major factor pushing silicon carbide's use by aluminum producers. Kaiser Aluminum, for example, pointed out over a year ago that the cost of silicon carbide was the biggest obstacle.

Changing Cell Design: Silicon carbide sidewalls may be only a forerunner of more important aluminum cell design changes. The cell's carbon bottom, which is often more than 15-in. thick, remains. The carbon, which has good electrical conductivity, protects steel cathode bars or collector plates imbedded in it from the molten aluminum that is below the molten cryolite electrolyte.

If titanium or zirconium diboride is used as cathode bars, silicon carbide could be used for bottom linings also. Both of these diborides resist attack by molten aluminum and cryolite as long as they are protected from oxidation by air. Cell capacity would be increased and power savings would total about 15% (the extra voltage now needed to enable current to travel through the present carbon bottom).

Norton, Carborundum and others* have carried out extensive development work to bring down the cost of diboride bar production. But the patent situation is clouded. British Aluminium holds British patents on titanium and zirconium diborides and carbides (the carbides are probably cheaper, but the diborides have better corrosion resistance). Kaiser had an exclusive license in this country, which reportedly has not been affected by Reynolds Metals' purchase of British Aluminium.

The British patent, however, is believed to cover only certain forms of the cathode bars, doesn't eliminate other titanium and zirconium diboride possibilities.

Other Processes: A number of ma
* Union Carbide and a joint American Potash

& Chemical-Firth Sterling venture.

jor aluminum companies have been working on new reduction processes. For example, Aluminium Ltd. has a new process (see p. 28) and Montecatini has a continuous process, reportedly held back by lack of suitable construction materials. Whether silicon carbide will find a place in these processes remains to be seen. Nitride-bonded silicon carbide is already finding its way into aluminum remelt operations in areas where wear is a major problem.

Meanwhile, Norton is pushing research on complex shapes for its new refractory. Conventional nitridebonded silicon carbide is now molded in pipe shapes, for example. But Norton estimates that similar shapes in the new material are at least six months away. The company is also working on a pump for molten metal transfer. (Silicon-carbide pumps for molten metal are already on the market; one is made by Metal Pumping Services, Inc., Cleveland.)

Love points out that in piping, silicon carbide would have to be classed as a fragile material. But because of its good thermal conductivity, it would probably be insulated, also have an outer loose metal casing, which would add to cost. Joints would have to be metal-clamped, include a gasketing of alumina-silica fiber. The new refractory can be joined and cemented with a finegrained silicon-carbide cement with aluminum-phosphate binder - the same type of cement that is used for conventional nitride-bonded silicon carbide.

However, the new refractory is difficult to patch satisfactorily. (Norton says it is working on patching materials, but is hopeful that the silicon carbide's good resistance to abrasion and corrosion will make the need for patching infrequent.)

The material, like conventional nitride-bonded silicon carbide, can be used in oxidizing atmospheres to 800 C, in reducing atmospheres above 1675 C, which, along with its lower cost, should make it a useful high-temperature ceramic for the chemical process industries. Norton is now testing it in many chemicals, is particularly interested in fluorides and chlorides. Aluminum making appears to have the edge in trial usage at the present, but other applications are certain to develop.

EQUIPMENT

Mechanical Equipment Checking. Stewart-Warner Corp. (1826 Diversey Pkwy., Chicago 14) and General Radio Co. (West Concord, Mass.) are out with two new devices for the checking of mechanical equipment.

Stewart-Warner is offering its new Model 703 cradle-type electronic equipment balancer as a moderately priced unit for small plants and shops. The unit is portable, costs \$3,040 f.o.b. Denver, Colo., will balance work weighing up to 500 lbs., 44-in. diameter, 4½- to 55-in. between bearing surfaces.

General Radio's new stroboscopic tachometer measures the speed of rotating equipment, permits observation of the equipment in slow motion. The portable unit can be used for speeds from 110 to 25,000 rpm. The unit, designated Type 1531-A, costs \$260 f.o.b. West Concord, Mass.

Cylinder-Operated Valve: Cylinders on Everlasting Valve Co.'s valves (49 Fisk St., Jersey City 5, N.J.) are now nose-mounted instead of pivot-mounted to save space on valves up to 1¼ in. Cylinders may be pneumatically or hydraulically operated; valves are straight-through disc types.

Heavy-Duty Pumps: Two- and three-stage centrifugal pumps for corrosive service with gritty, volatile fluids at high pressures are new offerings by Eastern Industries, Inc. (100 Skiff St., Hamden 14, Conn.). Mechanical seals will resist leakage under operating conditions from 28-in. Hg vacuum to 70-psi. pressure. Designs permit lubrication, cooling, flushing and quenching. Capacities: to 10 gpm.

Moisture Monitor: Weighing & Control Components, Inc. (538 East County Line Road, Hatboro, Pa.) is marketing a new dewpoint recorder that continuously measures moisture content of gases by determining the temperature at which vapor begins to condense. The unit has a photoelectric null system that measures the size of the dew spot formed on a metallic mirror. Size of the dew spot is maintained by heat to the mirror; temperature of the mirror can be translated into moisture content of gas. Electric or pneumatic controls are available for the unit.



The Wyandotte sales meeting that turned into an...

with pushbutton scoring devices ... gathered our sales force ... fired fifty searching questions on the characteristics and uses of Wyandotte products ... and found to no one's surprise that Wyandotte salesmen are up on the fine points of oxide products.

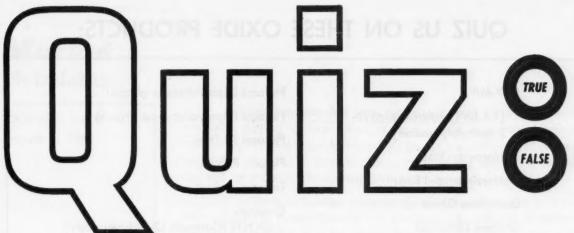
This is as it should be. We believe that a producer of oxides must be sure that his left hand knows what his right is doing. The lines between lab and field must be kept open. They are, at Wyandotte. And this is why our approach to oxide chemistry is both purposeful and productive.

Over the past seventeen years, we have applied our experience in oxide chemistry to many problems . . . and have scored successes

in many fields. Our Pluronic® polyols were the first block-polymers to be used commercially as nonionic surface-active agents. Our Pluracol® polypropylene glycols were among the first commercially acceptable polyethers for urethane foams. We pioneered in the development of ethylene oxide as a monopropellant for guided missile hardware. We have developed antifoams and rust inhibitors for antifreeze, and a new polyol for controlling the viscosity of nonflammable hydraulic fluids. These are but a few of our achievements. There are others . . . and more are coming.

If you have a problem that oxide chemistry might solve . . . get in touch with your Wyandotte representative. He knows alkylene oxides. He may have the answer for you . . . or start a search for it in our laboratories.





1.	One of the major uses of propylene oxide is as a raw material for oil demulsifying agents. True False
2.	A 10,000-gallon tank car of ethylene oxide may be unloaded in $\ \square$ 7-9 hours. $\ \square$ 4-6 hours.
3.	Ethylene oxide is an excellent stabilizing agent and fumigant.
4.	The Pluronic Grid is more useful to purchasing agents than to chemists. $\ \square$ True $\ \square$ False
5.	The chances are that Pluronic L62 is a better grade to use in machine-dishwashing compounds than Pluronic L64. True False
6.	Pluronic polyols can best be dissolved by pouring slowly into hot water while mixing. True False
7.	Pluronic L61 is an effective antifoam in antifreeze. $\ \square$ True $\ \square$ False
8.	When Pluronic L62 is used in a paper-coating formulation as a stabilizer for the starch-latex binder, it also decreases the viscosity of the

	binder, it also decreases the viscosity of the coating colors. $\hfill\Box$ True $\hfill\Box$ False
9.	The word Pluracol is an industry term meaning multi-hydroxyl group. \Box True \Box False
10.	In the Pluracol nomenclature, numbers used indicate the viscosity of various grades. $\hfill \mbox{$\square$ True \square False}$
11.	All members of the Pluracol E series of polyethylene glycols are liquids. \Box True \Box False
12.	With increasing molecular weight, members of the Pluracol P series of polypropylene glycols

☐ True ☐ False

become less water soluble.

13.	Water content of urethane tant in the production of u	iret		oam	s.
14.	Polyethers for one-shot ure a lot of interest initially, bu	ıt aı		dyin	g out.
15.	Pluracol polyethers prep oxide condensation term primary hydroxyl groups.	nina		suall	y, in
16.	Pluracol TP triols for ure from trimethylolpropane lene oxide addition.	exte	ended	by p	oropy-
17.	Pluracol polyethers used cations are solids.				~ ~

Check
your answers
on
the following
page...

QUIZ US ON THESE OXIDE PRODUCTS:

DHP-MP

[1,4-bis-(2-hydroxypropyl)-2-methylpiperazine]

Dichloroethyl Ether

Dichloroisopropyl Ether

Diethylene Glycol

Ethylene Dichloride

Ethylene Glycol

Ethylene Oxide

Monolene_®

[N-(2-hydroxypropyl) ethylenediamine]

Pluracol E (polyethylene glycols)

Pluracol P (polypropylene glycols)

Pluracol TP Triols

Pluronic Polyols

Tetronico Polyols

Quadrolo

[N,N,N'N'-tetrakis (2-hydroxypropyl) ethylenediamine]

Propylene Oxide

Propylene Dichloride

ANSWERS TO QUESTIONS ON PRECEDING PAGE

1. True. 2. 4 to 6 hours. 3. True. 4. False. (Our Pluronic Grid presents in graphic form the property trends for this series of block-polymers... shows which grades are likely candidates for specific functions. It minimizes random chemical evaluation and therefore is useful to both chemists and purchasing agents.) 5. True. (This is the type of information the Pluronic Grid shows at a glance.) 6. False. The Pluronics are more soluble in cold water. 7. True. 8. True. 9. False. Pluracol is the registered name for Wyandotte's polyoxyalkylene glycols. 10. False. All Pluracol grades are identified by numbers which indicate average molecular weights. 11. False. There are four liquid, and six solid grades in the series. 12. True. 13. False. 14. False. 15. False. Secondary hydroxyl groups predominate as a result of propylene oxide addition. 16. True. 17. False. Excluding possible minor exceptions, the polyethers used are liquids.

TRUE . . . Wyandotte knows a lot about alkylene oxides.

WYANDOTTE CHEMICALS



MICHIGAN ALKALI DIVISION

WYANDOTTE, MICHIGAN

OFFICES IN PRINCIPAL CITIES

Market

Newsletter

CHEMICAL WEEK August 6, 1960 Three petrochemical news reports last week focus attention on the battle shaping up over which of three products—petronaphthalene, coal-tar naphthalene or o-xylene—will fill the raw material needs of phthalic anhydride. At stake: a giant market, a result of the surging, worldwide demand for phthalic. These events took place last week:

- Plans to increase o-xylene capacity by 28 million lbs./year were unveiled by Enjay Chemical Co., Division of Humble Oil & Refining Co. The present 44 million lbs./year unit at Humble's Baytown, Tex. plant will be boosted to 72 million lbs./year by the end of the year. Moreover, the company points out that this operation could be readily expanded to 165 million lbs./year if necessary.
- Start of construction on Ashland Oil's 75 million lbs./year petronaphthalene unit at Catlettsburg, Ky. got underway. Ashland expects to be in operation about Feb. '61. This is the first of three U.S. petronaphthalene projects scheduled for construction this year (CW, June 25, p. 95).
- Sun Oil Co., another potential petronaphthalene producer, awarded the engineering and construction contract for its 100 million lbs./year unit to M. W. Kellogg Co. The plant will be located in Toledo, O. Meanwhile, Collier-Tidewater has plans for a 50 million lbs./year plant to be located at Tidewater's refinery in Wilmington, Del. Both Sun and Collier-Tidewater's plants are slated for completion near the end of next year.
- Major raw material for phthalic anhydride manufacture in the U.S. is by-product coal-tar naphthalene, which is subject to wide fluctuations in output due to its dependence on steel production. Petronaphthalene producers, aim to become a major second source and level out the supply picture. They also expect to share in growing worldwide demands for this chemical. However, if total announced petronaphthalene capacity of 225 million lbs./year is installed, there will be a glut of naphthalene in the U.S. market, by '62, unless most of it is exported.

Complicating the situation is o-xylene's growing role in this drama. Although Amoco currently has the only U.S. plant to make phthalic from o-xylene, several foreign phthalic producers, caught by the naphthalene shortage, have turned to this route. Actually this is one of the reasons behind Enjay's and other recently reported ventures, into this petrochemical.

Italy and Japan are the two largest customers for U.S. o-xylene output. And several other countries are reported to be studying the process. Last year several U.S. firms, caught short of naphthalene, by the steel strike, tried o-xylene in their units but found it rough on equipment, gave poor yields resulting in higher priced phthalic. But xylene suppliers counter

Market

Newsletter

(Continued)

that proper equipment is necessary to give economical results, point to Italy and Japan as good examples. It's estimated that about 75% of the phthalic produced in these countries use o-xylene as a raw material. This has stimulated new interest in this country to develop a more economical process, and several phthalic producers are now working on the problem.

But not all overseas producers will go along with the o-xylene route. CW learns that one of the large coal-tar naphthalene producers in Germany is now studying the different processes to make petronaphthalene, will definitely go ahead with a 100 million lbs./year unit shortly.

Another side to the problem is isophthalic acid, made from metaxylene. Last year's shortage of phthalic enabled Oronite, only U.S. producer of the chemical, to win some of phthalic's markets. Oronite is reportedly considering expanding its esophthalic unit.

What's the outlook for each of these chemicals in future phthalic markets? Of course the biggest factor will be economics, i.e. which process will yield lowest cost phthalic. Since coal-tar naphthalene is a by-product, and since most producers now have equipment to handle this product, this route will probably be the cheapest. It's probable that most of the coal-tar naphthalene produced will continue to be consumed by domestic phthalic makers.

Petro-naphthalene should be considered the second source of supply for naphthalene in this country, since the o-xylene route has not yet proved itself economically. O-xylene could move into the second slot if some big technical advances are made. But, no such developments have ocurred in the U.S., and foreign producers are keeping their processes, yields and other data under strict secrecy.

Foreign o-xylene sources, although small, have started to spring up. Antar in France is building a 20 million lbs./year unit, due onstream next year. And Mobil is reported interested in building a plant in Italy. These developments, against a background of U.S. capacity, which will approach 400 million lbs./year, portend an overcapacity of o-xylene in the U.S., in '61. This could lead to more pressure by xylene producers to break into U.S. phthalic markets.

Clearly, the entire situation is in a ferment. And, any forecast of the outcome would be premature. But, one thing appears certain, the naphthalene-phthalic market will pose some knotty problems during the next few years.

Chalk up another new gas processing unit. The \$3.9-million New Rayne Field, Tex., gas processing plant of La Gloria Oil and Gas Co. (subsidiary of Texas Eastern Transmission Corp. of Houston) is now in operation, has a capacity of 15,000 bbls./day of liquefied petroleum gas. Output will be sent to nearby processing plants for fractionation into propane, butane and natural gas.



Three experienced chemical operations...





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PRODUCTION
CAPACITY

VAST NATURAL
SOURCE OF
RAW MATERIAL

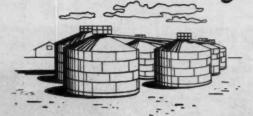
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WEST END CHEMICAL COMPANY . DIVISION OF STAUFFER CHEMICAL COMPANY

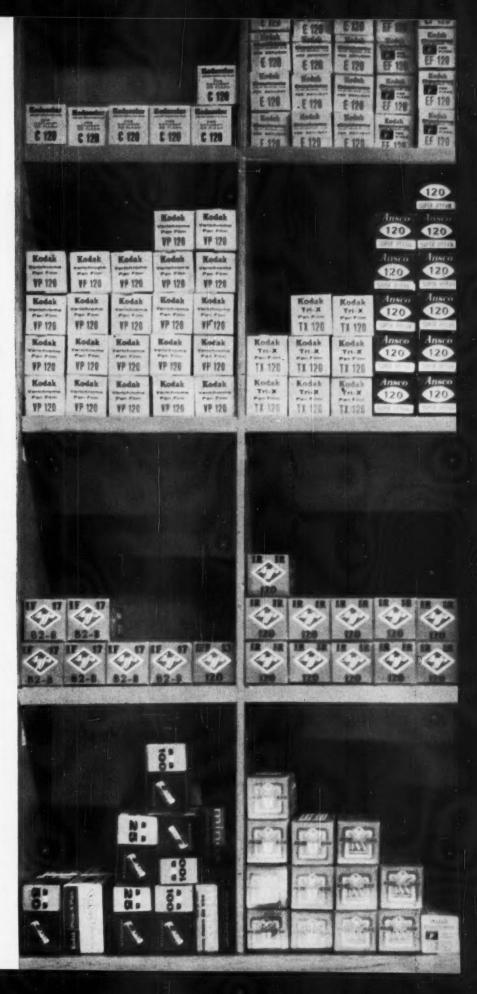
636 CALIFORNIA, SAN FRANCISCO 8, CALIF. . PLANT: WESTEND, CALIF,

Agfa-Back in Force on U.S. Photo Shelf

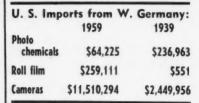
Wanted: plant site to build photographic processing lab. Buyer: Europe's biggest manufacturer of photographic goods. Purpose: to give Eastman Kodak, Ansco, and other domestic and foreign companies a better run for their money in the \$2.3-billion U.S. photo market.

That, in brief, is the gist of the current corporate planning of Agfa, subsidiary of Germany's Farbenfabriken Bayer, which re-entered the U.S. photo arena in '57 after a 15year hiatus. Once the company has found a suitable location for its proposed reversal-film developing lab proper water supply and waste disposal are main considerations - it will be able to introduce its Agfacolor CT-18. This product, a reversal film (like Kodachrome) makes positive color transparencies, will give the German company a high card with which to bid for the color film-dominated amateur film market here.

No Stranger: The film (ASA 50), faster than best-selling U.S. color types, and with improved color tones, is plainly essential to Agfa's regaining the strength here it once had. Back in '27, Agfa, through its purchase of Ansco (now a division of General Aniline Film Corp.), had







made its Agfa-Ansco films common items in photo stores. Then World War II put an end to distribution here, as the government seized Agfa. The rights to both tradenames—Agfa and Ansco—were turned over to General Aniline & Film (also seized, but now run as a U.S. firm, with some stock still government-held), which declined to use the Agfa name. In '57, Agfa asked for—and got—its tradename back from GAF, and started to rebuild itself here.

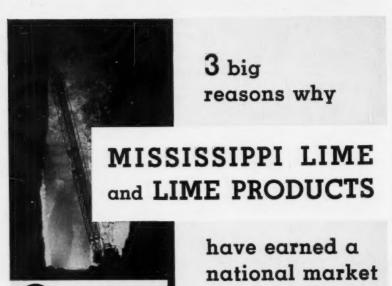
Agfa is considerably pleased with its progress in the three years since it reclaimed its tradename. Indicative of its progress: Willoughby's Camera Stores, one of New York City's biggest photo dealers, reports Agfa products are doing nicely, terms them "well accepted by the American public."

The company's operation now requires two sales offices: the main one is in New York, while its Glendale, Calif., office handles Western sales. Two warehouses are in New York, one in Glendale. Some 20 sales representatives operate in major cities, and it has tied in with Perfect Photo, Inc. (Philadelphia) for color processing work.

Agfa's staff here now numbers about 100 people. This breaks down into 70 or so employees in New York, 10 in Glendale, and 20 scattered salesmen. But growth of sales is a closely guarded secret.

Careful Buildup: The company has slowly built up its roster of franchised Agfa dealers to a total of 1,600. Today there are about 11,000 photo dealers in the U.S. but this includes, in addition to retail photo stores, photo departments in drug stores, supermarkets, etc. So far, Agfa has restricted its franchises to photographic supplies stores.

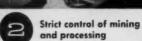
Worldwide, the German company markets about 4,000 products. The entire line is not offered in the U.S. However, the number to hit our photo counters is on the upswing. During its first two years in business here,



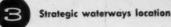


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But we can't help reminding you that the day-to-day economy of any pump lies in its operating efficiency plus how close it comes to meeting your exact performance requirements. Only after these conditions are met does a minimum number of parts lying in your storeroom really count.

So, to you it's most important that this line of Worthington SESC pumps contains more (not less) different types of impellers than any other line. It contains open, closed and semi-open impellers. Each is available in five different materials to handle abrasive or corrosive materials, water or slurries. In fact, because of the extensive impeller selection, this line offers a 'customerized' pump selection meeting more specific performance requirements than any other line.

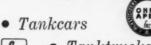
But don't take our word for it. Take a look at the SESC pump line. You'll see it's standardized to the nth degree in ratings up to 3000 gpm and 550 ft. heads. But there are more impellers to choose from ... thus you can buy a custom built pump at standard prices.

For the name of your nearest Worthington distributor consult the Yellow Pages or write Worthington Corporation, Section 20-18, Harrison, New Jersey.



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TBP is widely used for the solvent extraction of certain metals and rare earths. At present, in this field, the largest use is associated with the atomic energy processes both in the initial preparation of the ores and the recovery of spent reactor fuels. Our TBP meets the AEC specifications.

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SPECIALTIES

it sold cameras, equipment, black and white film, and paper, plus Copyrapid paper for office copying machines. Since then photochemicals, color film and paper, photo accessories, movie projectors, and magnetic tape have been added.

On a world basis, Agfa claims to be the second biggest producer of photographic merchandise in the world, but it has yet to offer real competition in the U.S. market. Other foreign photo companies selling here have a substantial head start. Gevaert, a Belgian firm, claims to be the leading European maker of photosensitive materials (it does not make equipment) and has big markets in the U.S. Another with more U.S. sales than Agfa is Britain's Ilford.

In terms of total photographic imports-including both sensitive material and equipment-West Germany exports nearly twice as much to the U.S. as any other foreign country. Last year it sent \$24 million worth, after which came Belgium with \$14 million and Japan with \$10 million. (But some \$11.5 million worth of cameras were imported from West Germany alone last year.)

So far, Agfa's cameras have been its most successful item here. Its fully automatic Optima (retail \$89.95) was introduced in the U.S. about a year ago and, according to Agfa, has chalked up significant sales. But it is clear that Agta wants to restore films to its prominent place in the profits picture.

Indicative of Agfa's new push is its expanded advertising program. Until last year, advertising was mostly limited to trade magazines and photo fan publications. With the debut of the Optima camera last year, it placed ads with consumer magazines, local radio and newspapers. In addition, the company has its eye on television -when its number of dealers grows larger.

A Few Thorns: The problems encountered in cracking the American market have been many, admits Agfa. A major one has been to re-educate U.S. shutter bugs as to who Agfa is. It finds that the older generation remembers Agfa from prewar days, but the age group from 15-40, who wield most of the buying power in the photo market, generally have never heard of it.

Another problem—now overcome

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"HYWAX-122" is composed of alcohol esters of myristic, palmitic and stearic acids with a chemically-bound emulsifier. Light color, heat stable, free of odor, with 120°F melting point. Won't exidize nor turn rancid. Data sheet, prices and samples on request.



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Plant near Philadelphia calendering lightweight vinyl plastic film seeks top-flight production manager to supervise all operations. Must be thoroughly experienced with all phases of vinyl film production and formulation. Top salary. Write full particulars, in confidence.

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TO READERS NOT SUBSCRIBING TO CHEMICAL WEEK NOW

You are undoubtedly familiar with the CHEMICAL WEEK BUYERS' GUIDE ISSUE received by CHEMICAL WEEK subscribers each year as part of service. Well, the 1961 edition of this 750-page volume is just about ready to go to press and will be mailed to current subscribers on September 24th.

Now, sure enough, as soon as this issue appears, we'll get a virtual avalanche of requests from non-subscribers desiring to purchase a copy. It happens every time this unique buying aid comes out.

Much as we dislike having to turn down such requests, we must explain that the BUYERS' GUIDE is distributed to CHEMICAL WEEK subscribers only and is not available for sale at any price today.

So, if you would like a copy and are not currently a subscriber, why not avoid disappointment by entering your subscription to CHEMICAL WEEK now. All you need do is fill in the attached order card which entitles you to receive the 1961 BUYERS' GUIDE ISSUE, as well as the next 156 weekly issues of CHEMICAL WEEK for only \$5 (or 52 issues for \$3, if you prefer).

But you must hurry if you wish to start service with this issue, since our print orders are naturally made up in advance, and the high cost of this volume precludes our running a large surplus.

The 1961 BUYERS' GUIDE ISSUE actually contains 10 up-to-the-minute directories in one huge volume . . . over 9,000 items of chemicals, equipment, raw materials and services . . . listed by product, company and trade name — more than 170,000 listings in all. Within these pages are all the answers to your source of supply questions.

Since you are now reading this copy of CHEMICAL WEEK, you already know what a top-notch bargain this weekly magazine is by itself (little more than 3ϕ per issue at the three year rate). We don't see how you can pass up the chance of having your own copy—fresh, fully-intact and "when you want it"—delivered every week of the year to your home or office—at such insignificant cost to you.

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signed to fit your needs.

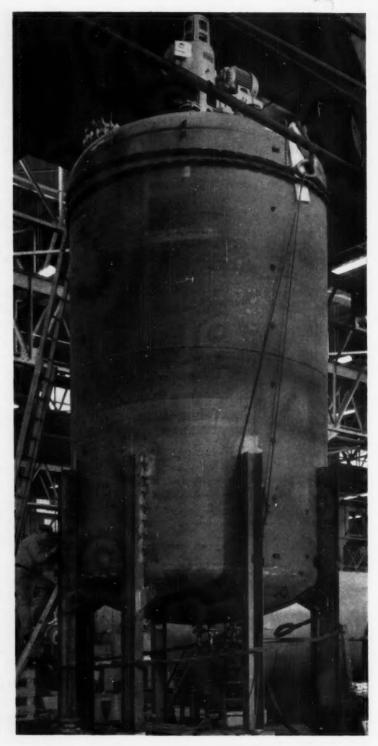
For example, we recently supplied a 7,150gallon reactor for processing monochloracetic acid and alcohol at 158° F., with jacket designed for 25 psi pressure at 350° F.

Then there are the really big 35,000-gallon Glasteel storage tanks, a very common sight on our production lines.

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Facts for your files. Bulletin 932 covers Pfaudler Polymerizers. Bulletin 975 details the economies of and specifications for Glasteel Storage. We'd be happy to send copies or answer questions about BIG Glasteel tanks. Write to the address shown on the facing page.



Hardly a "puff" in the (ClO₂) package

"Puffs," frequently caused by rust contamination of sodium chlorate, once were accepted as an inevitable problem in generating chlorine dioxide.

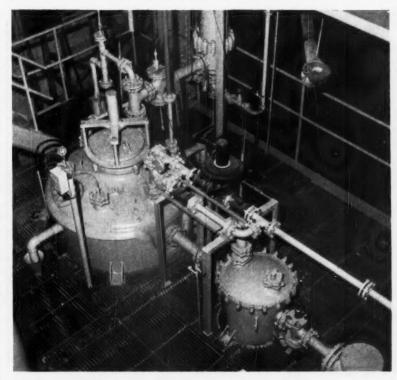
But no longer—not since Pfaudler

Glasteel has found increasing use in this Glasteer has found increasing use in the field. Take, for example, the complete Pfaudler plant at Gaspesia Sulphite Company Ltd., Chandler, Quebec. On stream since November 1959, this fatter of the first of the fi cility has experienced only two "puffs." So noteworthy is this record, that the installation has been dubbed the "puffless wonder.

The picture shows you part of the equipment that has made this kind of performance possible at Gaspesia-Glasteel primary and secondary generators and stripping column, interconnected with F-C Clasteel pipe. Elsewhere in the plant you'll find scrubber and absorption columns; storage for chlorate, chlorine dioxide, and raw material feeds; centrifugal pumps; and valves all of Glasteel construction.

What it adds up to is an integrated facility that not only keeps "puffs" down, but also solves all of the severe corrosion problems encountered in the making and storing of chlorine dioxide.

Forty other progressive pulp mills are also making good use of Pfaudler Glas-teel equipment. In every case it's shown itself to be the most economical material available in terms of initial



cost, maintenance, and service life. We offer not only equipment, but design, complete engineering, procurement and installation. We would be happy to work with you or your engineering firm on ${\rm ClO_2}$ generating systems. Write to the address shown on this page for additional information.



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can also do it in your plant with almost any standard dry-abrasive cutoff wheel. Then it's a simple matter of threading, fire-polishing (with a small portable furnace available from us) and finishing with a belt sander. This pipe is rated at 150 psi and comes in 11/2, 2 and 3-inch diameters.

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ing and control), and waste treatment.
In each section you'll find summaries of specifications along with illustrations of the equipment described. Ask for Bulletin 992.

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SPECIALTIES

—was that U.S. photo processing equipment was not set up to handle Agfa film. It has since brought over its own equipment, feels its service has improved considerably, but will, of course, have the problems attendant upon its introduction of CT-18.

Back Home: In Germany, the strides made by Bayer's wholly owned subsidiary have become more dramatic in the past few years. Although Bayer is loath to reveal any precise sales figures for its Agfa plants — photochemicals, paper, and magnetic tape are made in Leverkusen, cameras, lenses and lightmeters in Munich—an estimated 15% of Bayer's total sales of \$583 million in '59 probably stem from Agfa.

More than 10,000 of Bayer's 55,000 employees work for Agfa.

Bayer's investments in its Agfa subsidiary have tended to be heavy since '52. New film plants in Leverkusen, labs and production facilities in Munich, and a network of special plants for developing reversal color film in various foreign countries, such as India, have required outlays of \$5-6 million/year. Expansion will continue in '60, as the company adds 290,000 sq. ft. to its Munich camera plant.

General expansion for Bayer abroad is continually intensifying. In Toronto, it has founded a \$50-million basic capital financing company, Bayer Foreign Investments Ltd. (Bayforin), which presently manages its 73 subsidiaries in the U.S. (including photo affiliates), Latin America, Africa and Western Europe. Some 45 of these subsidiaries are merely sales organizations; 16 also have production facilities.

Catching Up: Agfa, once part of I. G. Farben, Germany's prewar chemical giant, is judged the biggest of Germany's 20-odd photochemical companies today, and on a world basis is second to U.S.-based Kodak. This is somewhat misleading, however, since the gap between first and second place in this particular race is sizable.

Now, in trying to strengthen its U.S. position, Agfa faces well entrenched U.S. and foreign firms. It has a way to go before it catches up with either, but its strength should not be sold short. Chances are it is just getting into position for a really big drive.



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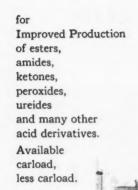
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SPECIALTIES

Annual CSMA Contest

Ground rules for the Chemical Specialties Manufacturers Assn.'s ninth annual aerosol packaging awards contest are now set.

This year, three new categories have been added to the design competition. Prompted by rising sales of these spray items, CSMA will give awards for automotive, horticultural, veterinary and pet products. In addition, a special category for foreign entries has been set up.

Other classifications for the contest include insecticides, room deodorants, paints, household products, shave products, hair preparations, perfumes and colognes, personal products, food, pharmaceuticals, and industrial aerosols.

The best package will be selected from each of the 15 groups, and a grand prize will be awarded for the best package of the contest. Closing date for entries is Oct. 15. All products must be on the market prior to Sept. 1.

Winners will be announced at CSMA's annual meeting in Hollywood, Fla., Dec. 5-8.

Kudos for Crest

Procter & Gamble Co. (Cincinnati) one-upped its competitors in the toothpaste field this week. The occasion was official recognition by the American Dental Assn. of P&G's Crest as "an effective decay-preventive agent." Crest is the first dentifrice to receive ADA's approval. It has been on the market five years.

ADA, having conducted seven clinical tests on toothpastes (tests varied from one to two years), concluded that "Crest has been shown to be an effective anticaries dentifrice that can be of significant value when used in a conscientiously applied program of oral hygiene and regular professional care." In further tribute to the effectiveness of Crest, ADA stated that none of the other dentifrices tested measured up to ADA's requirements.

The organization added, however, that stannous fluoride, the main ingredient in Crest, was merely an aid, and not a cure-all, in combating dental decay. Fluoridation of community water supplies still remains the best means of obtaining the benefits of fluorides, according to ADA.

EXPANSION

West Coast Plant: The Westport Chemical Co. (Seattle) is constructing a new research lab and plant at Longview, Wash., for the production of plasticizers, anticorrosion agents and other materials for the adhesives industry. The plant is expected to go onstream about Jan. 1, '61.

Keeping Up with Times: Dolphin Paint and Varnish Co. (Toledo) has changed its name to Dolphin Paint and Chemical Co. Reason: chemistry was playing a more important part in production of the firm's marine products.

Buys Hair Colorants: Lehn & Fink Products Corp. (New York) has acquired Noreen Inc. (Denver, Colo.), maker of hair colorants. Besides the hair colorants, Lehn & Fink picks up Liqui-Color hair rinse and La Viola hand cream.

Glass Fiber Startup: M. Lowenstein & Sons, Inc. (New York) has entered the glass-fiber field with formation of Clark-Schwebel Fiber Glass Corp. as an independent affiliate. The new group, which will engage in weaving, finishing and marketing industrial and decorative glass fabrics, has offices in New York.

Revlon-Balmain Team Up: Revlon Inc. (New York) has bought a controlling interest in Les Parfums Pierre Balmain, S.A. (Paris). The move gives Revlon worldwide rights to produce and distribute perfume and other cosmetics under the name of Balmain, one of Paris' top fashion designers. Financial details were not disclosed.

Grace Changes Names: W. R. Grace & Co. (New York) changed the names of two of its chemical divisions. Henceforth, Grace Chemical Division will be called Nitrogen Products Division, while Dewey and Almy Overseas Division will be Overseas Chemical Division. Both changes reflect wider operations of the divisions.

Acquire Coatings Firm: C. H. Dexter & Sons, Inc. (Windsor Locks, Conn.), specialty paper mill, has acquired The Chemical Coatings Corp. (Rocky Hill, Conn.), chemical coatings and industrial finishes maker.

Tracers

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Chemical & Mechanical Engineers. Engineer to work in Missile Development Department and co-ordination of product development. Also would make sales contacts. Three to five years experience in re-enforced plastics desired. Please reply in writing to: Mrs. C. Murpby, Haveg Industries, Inc., 900 Greenbank Read, Wilmington 8, Delaware.

Technical Service Men—Unusual opportunities for technical service chemists or chemical engineers; 1-3 years experience desired in one or more of the following areas: Polyester resins, surface-active agents, polyurethanes. Travel required out of Company's Austin, Texas laboratories. Expanding group with progressive petro-chemical company. Salary open. Excellent employee benefits. Send resume in confidence to: Personnel Manager, Jefferson Chemical Co., Inc., P.O. Box 303, Houston 1, Texas.

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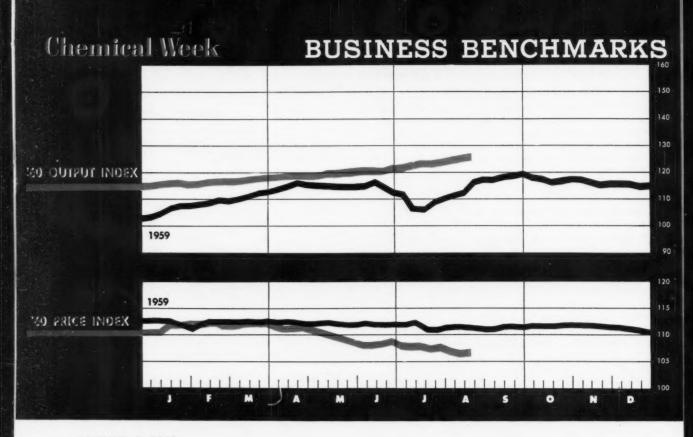
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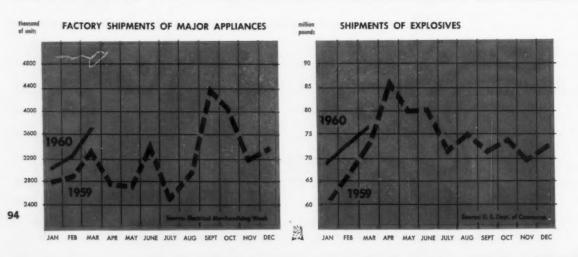
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Chemical Week wholesale price index (1947=100)		107.3	106.9	110.9
Stock price index (12 firms, Standard & Poor's)	1	47.05	48.83	61.60
Steel ingot output (thousand tons)		1,533	1,550	345
Electric power (million kilowatt-hours)		14,425	14,208	13,577
Crude oil and condensate (daily av., thousand bbls.)		6,855	6,832	6,855
EMPLOYMENT INDICATORS (thousands)		Latest Month	Preceding Month	Year Ago
All manufacturing		16,519	16,522	16,182
Nondurable goods		7,011	6,980	6,863
Chemicals and allied products		822	878	852
Paper and allied products		566	568	561
Rubber products		258	263	236
Petroleum and coal products		232	234	236

CHEMICAL CUSTOMERS CLOSE-UP.



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August 6, 1960

*ALLIED CHEMICAL CORP 45-52 Agency—Benton & Bowles, Inc.	GENERAL AMERICAN TRANSPORTATION CORP. 8 Agency—Edward H. Weiss & Co.	WORTHINGTON CORP
AMERICAN MESSER CORP70-71 Agency—Seberhagen, Inc.	GOULD PUMPS, INC	*WYANDOTTE CHEMICALS CORP 75-78 Agency—Brooke, Smith, French & Dorrance, Inc.
AMERICAN MINERAL SPIRITS CO 15 Agency—Leo Burnett Co., Inc.	GREEFF & CO., INC., R. W	
ANSUL CHEMICAL CO	HARDINGE COMPANY, INC	
*BAKER CHEMICAL CO., J. T	*JEFFERSON CHEMICAL CO	tracers SECTION (Classified Advertising)
*BERKSHIRE CHEMICALS, INC 92 Agency—Givaudan Adv., Inc.	McGRAW-HILL BOOK CO 90	F. J. Eberle, Business Mgr. BUSINESS OPPORTUNITY
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*COLTON CHEMICAL CO., A DIV. OF AIR REDUCTION CO., INC	POWELL CO., THE WILLIAM 61 Agency—The Raiph H. Jones Co.	ADVERTISING STAFF
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Agency—The Griswold-Eshleman Co.	PUBLICKER INDUSTRIES, INC 30-31 Agency—Al Paul Lefton Co.	Boston 16Paul F. McPherson, 350 Park Square Building, HUbbard 2-7160
CROWN CORK & SEAL CO	RHODIA, INC	Chicago 11 Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800
DAY CO., JOSEPH P	SCIENTIFIC DESIGN CO 4th Cover Agency-Michel Cather, Inc.	Cleveland 13 H. J. Sweger, Duncan C. Stephens, 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000
DELHI-TAYLOR OIL CORP 69 Agency-Sam J. Gallay Adv.	SHARPLES CORP., THE	Dollos 1 Gordon Jones, John Grant, The Vaughan Bldg., 1712 Com- merce St., Riverside 7-5117
DIXON CHEMICAL & RESEARCH, INC 2 Agency-Ray Ellis Adv.	Agency—J. Walter Thompson Co. 65	Denver 2 J. Patten, 1740 Broadway, ALpine 5-2981
	SMITH, INC., WERNER G	Penobscot Bldg., WOodward 2-1798
DOW CHEMICAL CO., THE	STANDARD STEEL WORKS, INC 14 Agency—James II. Reese Adv. Co.	Frankfurt/Main Stanley Kimes, 85 Westendstrasse, Germany
DOW INDUSTRIAL SERVICE DIV. OF THE DOW CHEMICAL CO	*TRUBEK LABORATORIES, THE 91	Geneva Michael R. Zeynel 2 Place du Port, Geneva, Swits.
Agency—Rives, Dyke, & Co., Adv.	Agency—Ray Ellis Advertising	Houston 25 Gene Holland, W-724 Prudential Bldg., JAckson 6-1281
*ENJAY CHEMICAL CO., A DIV. OF HUM- BLE OIL & REFINING CO 96, 3rd Cover Agency—McCann-Erickson, Inc.	UNION BAG-CAMP PAPER CORP 56-57 Agency—Smith, Hagel & Knudsen, Inc.	London E.C. 4 . E. E. Schirmer, N. Murphy, McGraw-Hill House, 95 Farringdon St., England.
*FMC CHEMICALS & PLASTICS DIV.,	UNION CARBIDE CHEMICAL CO., DIV. OF UNION CARBIDE CORP	West Sixth St., HUntley 2-5450
PFMC CHEMICALS & PLASTICS DIV., FOOD MACHINERY AND CHEMICAL CORP. Agency—G. M. Basford Co.	Agency—J. M. Mathes, Inc. *VITRO ENGINEERING CO	New York 36 Charles Haines, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959
FMC CHLOR-ALKALI DIV., FOOD MACH INERY & CHEMICAL CORP 2nd Cover Agency—James J. McMahon Adv		Philodelphia 3 William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330
	Agency-Farson, Huff & Northlich, Inc.	Pittsburgh 22 Duncan C. Stephens, 4 Gateway Center, EXpress 1-1314
*FULLER CO., THE	WEIGHING AND CONTROL COMPONENTS, INC. 58 Agency—Thomas R. Sundheim Adv., Inc.	San Francisco 4 William C. Woolston,
GAYLORD CONTAINER DIV. OF CROWN ZELLERBACH CORP	WEST END CHEMICAL CO	St. Louis 8R. J. Claussen, 8615 Olive St., Continental Bldg., JEfferson 5-4867

*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

WHAT'S NEWS IN CHEMICALS



ENJAY OLEFINS—Enjay markets tetrapropylene, tripropylene and nonene. These chemicals fulfill the most rigid requirements as raw materials for anionic and nonionic detergents. Uniform purity and high quality contribute to the modern detergent's ability to get hard-to-wash surfaces cleaner.



TRIDECYL ALCOHOL — Water soluble nonionic surface active agents formed by the reaction of tridecyl alcohol with ethylene oxide are extremely well suited for use as household detergents. Surfactants made with tridecyl alcohol help increase penetrating power and loosen dirt.

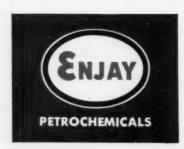


TECHNICAL ASSISTANCE—At the Enjay laboratories, expert technical assistance and the latest testing facilities are available. Here, Enjay technical personnel can help you develop new products...improve existing ones.



QUICK SHIPMENTS — Shipments are made from conveniently located plant and storage facilities. Surfactant manufacturers are assured of prompt delivery and high uniform product quality when they order from Enjay.

LOOK TO ENJAY... A DEPENDABLE SOURCE



Manufacturers of surfactants need look no further than their nearest Enjay office for their raw material and technical service needs. A complete line of chemicals for light- and heavy-duty detergents—powdered or liquid—as well as emulsifiers, wetting agents and foam stabilizers are available for prompt delivery.

Enjay chemicals like tetrapropylene, tripropylene and nonene fulfill the most rigid requirements as basic ingredients for anionic and nonionic detergents. They contribute to the modern detergent's ability for getting hard-to-wash surfaces cleaner ... with less work.

Enjay also markets other chemicals for surfactants. These include Isooctyl Alcohol – Tridecyl Alcohol – Decyl Alcohol – Isopropyl Alcohol – and Ethyl Alcohol. For further



FOR YOUR SURFACTANT RAW MATERIALS

information or technical assistance, phone or write the Enjay office nearest you. *Home Office*: 15 West 51st Street, New York 19, N. Y. Other Offices: Akron • Boston Charlotte • Chicago • Detroit Houston • Los Angeles • New Orleans Plainfield, N. J. • Tulsa

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY



SCIENTIFIC DESIGN'S PROCESS SKILLS continue to make news

Here are some recent technical developments reported in the press

PETRO-TEX TO BUILD WORLD'S LARGEST MALEIC ANHYDRIDE PLANT

May 24—Scientific Design Company will design a 30,000,000 pound per year maleic anhydride plant using a new Petro-Tex process employing butene feedstocks and certain phases of SD's own process.

GOODYEAR TIRE AND RUBBER COMPANY TO PRODUCE 2 NEW SYNTHETIC RUBBERS

May 17—Scientific Design Company will design and engineer new polyisoprene and polybutadiene plants in Beaumont, Texas.

Phthalic Anhydride Producers Offered Raw Material Flexibility

June 6—Scientific Design Company announced a new catalyst which for the first time permits the use of ortho-xylene, naphthalene or any mixtures of both as raw materials.

SD-SW PROCESS MAKES SEA WATER FRESH

May 24—Scientific Design Company and Struthers Wells Corporation have successfully tested a new freezing process to produce fresh water. The process represents a major breakthrough in the production of large ice crystals through the controlled crystallization of sea water.



SCIENTIFIC DESIGN COMPANY, INC.

Leader in Design, Development, Construction of Chemical Plants

EXECUTIVE OFFICES: TWO PARK AVENUE, NEW YORK 16, NEW YORK
THE SD GROUP:

SD Plants Inc., New York . SD Plants Canada Ltd., Toronto

SD Plants Ltd., London, England Catalyst Development Corporation, New Jersey
Société Française des Services Techniques S.a.r.l., Paris, Françe

